

Summer Crane Flies (Tipulidae) of the Mountain Lake Vicinity, Virginia

George W. Byers

Snow Entomological Museum
University of Kansas
Lawrence, Kansas 66045

INTRODUCTION

Crane flies (Diptera: Tipulidae) are common insects in almost any natural habitat in the Appalachian Mountains. One species or another may be found from early spring until well into autumn (and *Chionea* in winter). Like most nematocerous Diptera, the crane flies are associated with mesic environments such as are characteristic of most of the Appalachian region. Crane flies found in the vicinity of Mountain Lake, Virginia, are representative of the central and southern Appalachian fauna. They are primarily temperate-woodland species that are widespread in eastern North America or boreal species whose ranges extend southward along the Appalachian ridges where ecological conditions resemble those farther north at lower elevations. Only a few are essentially southern in distribution, reaching their northern limits in central Appalachian valleys.

If Professor J. Speed Rogers (JSR), of the University of Michigan, had lived a decade beyond his untimely death in 1955, he might have published an account of his many collections of crane flies in the vicinity of Mountain Lake Biological Station (MLBS), in Giles County, western Virginia (see Fig. 1). After having visited the Station briefly (5 days) in 1935, he was invited to teach a course in general entomology there in 1939. (The course had been taught only twice before since the Station was opened in 1929.) Incidental to his teaching, in 1939, Rogers continued his search for crane flies, and during the years of World War II he took short summer vacations from his busy teaching and administrative schedule at the University of Florida to return to Mountain Lake in late June and early July 1943 and mid-July to late August 1944. Again in May and June of 1946 and for a few days in late summer (early September) of 1947 he sought to learn what crane flies might be present before and after the dates of his earlier collections.

It was Prof. Rogers who introduced me to the Mountain Lake region. On a hurried field trip from the University of Michigan, in spring 1949, when I was his

laboratory assistant, we stayed at the still snow-covered Station and searched for crane flies in the much warmer valleys, on 6 and 7 April.

My own collecting around Mountain Lake was under much the same conditions as Rogers' of 1939 - that is, incidental to teaching at the Station. Beginning in 1961, I taught a course entitled "Biology of Insects," in either the first or second five-week summer session, 16 times in the next 32 years, each summer collecting crane flies when there was an opportunity. This included collecting by net, usually on afternoon field trips to various habitats with my class, collecting at lights of Station buildings, and occasional collecting at lights in the town of Pembroke or elsewhere "in the valley."

Most of the collections made by both Prof. Rogers and me were along what could be considered an altitudinal transect, from the New River near Pembroke and Goodwins Ferry (elevation 503-515 m, or 1650-1700 ft), up over Salt Pond Mountain and Big Mountain (elev. 1250 m, or 4100 ft, at Wind Rock), and down into the valley of Stony Creek (locally called Big Stony) in the vicinity of Kire (a village at elev. 820 m, or 2690 ft). This transect is wholly within the northeastern half (approximately) of Giles County, as the county is divided near mid-length by the New River. Many different habitats can be found on and near the described transect, and almost all are easily reached from the Biological Station, the most remote site (Goodwins Ferry) being only nine air miles (14.5 km) from the Station.

REGIONAL CHARACTERISTICS

In the part of Giles County including the places mentioned, ridges of the Appalachian Mountains are oriented northeast-southwest, in general. The county here lies between two such ridges, Peters Mountain on the boundary of Virginia and West Virginia and Gap Mountain on the border of Giles and Montgomery counties. This area is included in the Ridge and Valley Physiographic Province. Sandstone outcrops occur along



Fig. 1. Central eastern United States, showing location of study area in southwestern Virginia.

the crests of the ridges, for example at Wind Rock (6.2 km NNE of Mountain Lake), and form cliffs in some places, such as Bear Cliff (1.7 km east of the lake). Annual precipitation of about 40 inches (100 cm) contributes to growth of a generally mesic forest, much of which, however, was removed by the lumber industry in the early 20th century and replaced by second-growth forest. Typical trees in this mesic forest on the upper slopes are white and red oaks (*Quercus alba* and *Q. rubra*), other oaks, red maple (*Acer rubrum*), striped maple (*Acer pennsylvanicum*), basswood (*Tilia americanum*), yellow birch (*Betula lenta*), hickory (*Carya* spp.), buckeye (*Aesculus* spp.), black gum (*Nyssa sylvatica*), and dogwood (*Cornus* spp.). Chestnut (*Castanea dentata*) was formerly an important tree in the area, but because of a blight it is represented now by rotting logs, stumps, and young “suckers” near those stumps. Here and there are *Rhododendron* thickets, and groves of hemlock (*Tsuga canadensis*), particularly near water, and in drier places localized stands of pine, especially white pine (*Pinus strobus*) and pitch pine (*P. rigida*). *Kalmia latifolia* is common, and a variety of

herbaceous plants occur particularly near brooks and streams and other places where humus has formed. Ferns (*Osmunda*, *Aspidium*, *Pteridium*, and others), mosses, liverworts, and lichens are common throughout the forest.

These ecological details give an impression of the region, but they tell little about the microhabitats in which larval tipulids live. Such things as shade, moisture, and decomposing organic matter are surely important in the larval life of most crane flies, in one way or another. Unfortunately, the immature forms of only a few species of North American tipulids are known and have had their habitats described. Reference is made, in the following list of species, to sources of information on the larval habitats.

Crane fly collections from other areas in the Appalachians, as well as those from the Mountain Lake vicinity, indicate the species richness of these flies. In the Great Smoky Mountains National Park, for example, Alexander (1940) recorded 167 species (52 Tipulinae, 1 Cylindrotominae, 112 Limoniinae, and 2 non-tipulid “crane flies”). Later, he reported 194 species from mountainous western North Carolina (54 Tipulinae, 1 Cylindrotominae, 135 Limoniinae, and 4 others) (Alexander, 1941). On the Cumberland Plateau, primarily in eastern Tennessee, Rogers (1930) found 152 species (46 Tipulinae, 1 Cylindrotominae, 104 Limoniinae, and 1 Ptychopteridae). Most of these species recorded by Alexander and Rogers are the same as those from the Mountain Lake area.

MAIN COLLECTING SITES

Mountain Lake (ML) itself seems a likely place from which to measure to the sites where most collecting of crane flies was done by either Rogers or me. With a surface area of approximately 100 acres (40 ha), it is a conspicuous physical feature on maps of the region. From the lake’s center (CML) of length and width, straight-line distances to most of these sites were measured on the U. S. Geological Survey map (Virginia-West Virginia Pearisburg Quadrangle, 1937 edition). Most elevations also were determined from this map.

Bald Knob, 1330 m (4363 ft), highest point in the region, described by JSR as “rocky pasture”; not visited by GWB for collecting; 1.2 km (0.7 mi) slightly west of south from CML.

Bear Cliff, 1189-1220 m (3900-4000 ft), southeast side of Salt Pond Mountain, facing approximately east; 1.7 km (1.1 mi) east of CML; characterized by “rock houses” beneath overhanging ledges of sandstone; few collections here.

Cascades, 900-870 m (2950-2854 ft). Little Stony Creek descends rapidly over rock ledges, into a narrow ravine north of Doe Mountain. The main cascade, 3.6 km

(2.2 mi) WNW of CML, is over 65 ft (20 m) high. Erosion has produced numerous moist, shaded surfaces beneath rock ledges, some overgrown with mosses and ferns; slopes beside creek are covered with mixed hardwoods and conifers, with herbaceous plants along margins of stream and trails.

Clover Hollow, 716 m (2350 ft), is a long valley, southwest to northeast, between Johns Creek Mountain and Clover Hollow Mountain; site of most collections is near end of county road 601, about 6.9 km (4.2 mi) east of CML; mesic woods of oaks, maple, hickory, beech, buckeye; jewelweed (*Impatiens*) in seepage areas along brook.

Cold Spring (in JSR notes as Newport Road Spring, Public Spring, Roadside Spring), 2.5 km (1.5 mi) southwest from CML (1.3 road miles downhill from Mt. Lake Hotel at south end of ML); 1052 m (3450 ft); a talus slope facing generally northwest; mixed deciduous forest with undergrowth of low herbaceous plants; mosses on rocks near spring.

Doe Creek (upper part, where most collections were made), 945 m (3100 ft), 2 km (1.2 mi) southwest of CML; woods of oak, horsechestnut, basswood, maple, hickory; slopes beside brook steep, with areas of *Impatiens*, nettles, *Eupatorium*, brambles.

Garden of the Gods, 1181 m (3875 ft), at north end of Mt. Lake; area of large rocks, shaded rock ledges, with abundant lichens, mosses, ferns; hemlock and *Rhododendron* common.

Goodwin's Ferry on New River at mouth of Spruce Run, 507 m (1662 ft); willow trees, box elder, some sycamore; "lush vegetation of river bank and flood plain" (JSR note).

Hunters Branch, a brook flowing generally westward to join Pond Drain (1.8 km NNW of CML; its two tributaries are locally known as Mud Branch, coming from the vicinity of MLBS, and South Fork.

Little Meadows, along Little Stony Creek, 945 m (3100 ft), 3.9 km (2.4 mi) northwest of CML; area of diverse vegetation: woods of white pine, red maple, white oak, black oak, wild cherry, with alder, azaleas, and some *Rhododendron* along creek; large areas of *Dryopteris* ferns, greenbriers (*Smilax* spp.) common.

Mountain Lake Biological Station (MLBS), 1174 m (3850 ft), about 2.3 km (1.4 mi) NNE of CML; nearly flat area with second-growth woods of white and black oaks, sugar maple, red maple, hickory, black gum, small chestnut trees; undergrowth of *Dryopteris* and bracken ferns, *Vaccinium* shrubs, greenbriers, grasses, and *Carex*, many broad-leaved herbaceous plants in more open areas. Mud Branch flows across south edge of Station grounds.

Mud Branch, 1174 m (3850 ft); woods of second-growth oaks, some white pine, ericaceous shrubs, areas of ferns, grasses, and low, broadleaved herbaceous plants.

Since 1967, Mud Branch has been dammed to form a pond near the main laboratory building of the MLBS; emergent vegetation quickly appeared at the pond's margin. See also Hunters Branch.

Pond Drain (Lake Drain in JSR notes), flows almost northward from NW end of Mountain Lake to join Little Stony Creek.

Sinking Creek collections were actually made at two different sites but similar habitats: U. S. Highway 460 at crossing 7.4 km (4.6 mi) ESE of Pembroke, near Lucas Memorial Church, elevation 534 m (1750 ft), and at crossing of Virginia Highway 700 (near old covered bridge) 11 km (6.8 mi) ESE of Pembroke, 549 m (1800 ft). At both localities the vegetation along the creek consisted of willows, sycamore, black locust, some elm and walnut, with undergrowth of *Impatiens*, nettle, giant ragweed (*Ambrosia*), fleabane, poison ivy, hog-peanut (*Amphicarpa*).

South Fork (see Hunters Branch), in JSR notes often referred to as "heads of South Fork" (1189 m); a short tributary of Hunters Branch.

Tawny's Cave, 595 m (1950 ft), or in JSR notes simply "cave," about 0.15 mi (0.24 km) east of Highway 700 crossing of Sinking Creek; no GWB collections here.

White Pine Lodge, 968 m (3174 ft), near junction of Pond Drain and Little Stony Creek; few collections by JSR only.

White Rocks Forest Service Campground, average 907 m (2950-3000 ft), about 8.4 km (5.2 mi) NNE of CML; mixed woods of white oak, red oak, red and striped maples, yellow birch, hickory, hemlock, some white pine; understory of sassafras, dogwood, alder, *Kalmia*, *Rhododendron*; swampy areas near small stream (tributary of Stony Creek, or "Big Stony") with skunk cabbage (*Symplocarpus*), ferns, some grasses; broad-leaved herbaceous plants on higher ground.

Wind Rock, sometimes called Wind Rocks or Castle Rock (not to be confused with Castle Rock on the New River at Pembroke), 1250-1265 m (4100-4150 ft), 6.2 km (3.8 mi) NNE of CML, on the Appalachian Trail. Woods of red, white, and black oaks, red, striped, and sugar maples, chestnut saplings to 20 feet (6 m) high, hickory; understory of young oaks and chestnut, shrubs of blueberry (*Vaccinium*), azaleas, brambles (*Rubus*), gooseberry, and *Kalmia*; leaf litter deep in some areas (as among ferns), absent in others; sandstone outcrops along crest of Potts Mountain, with mosses, lichens, and liverworts on shaded, usually moist surfaces.

ORGANIZATION AND METHODS

In the following list of species, most of the information is summarized from collections made in several different years, perhaps in different places and

somewhat different habitats. Specific localities and their ecological characteristics are mentioned when observations of a particular species collected there are in some way unusual or give useful information about the species' distribution. Similarly, dates of collection are given only for month and day or span of days (i.e., year omitted) to indicate the seasonal occurrence of a species in the Mountain Lake region. When larval habitat is known, appropriate literature references are cited.

Nearly all species found in the region are sufficiently widespread in eastern North America that they are briefly discussed and identified by taxonomic keys in C. P. Alexander's (1942) chapter on Tipulidae in the Diptera of Connecticut. Reference to that important publication is made simply by the letters DC followed by the page number. The previously described geographic range of each species, often from the 1965 Catalog of the Diptera of America North of Mexico (Alexander, 1965; Stone et al., 1965), is indicated by the letters PR followed by names of states or regions, or provinces of Canada, that describe the known range.

In the following account of species, I have used the system adopted by C. P. Alexander (1942, 1966, 1981), J. S. Rogers, and others. That is, the family Tipulidae includes three subfamilies: Tipulinae, Cyndrotominae, and Limoniinae. In recent years, all three have been elevated to familial status (Tipulidae, Cyndrotomidae, and Limoniidae), primarily by European dipterists, and the limoniines have been further subdivided into Limoniidae and Pediciidae. These changes in taxonomic status are not based upon new information about relationships. I still regard the crane flies (Tipulidae, *sensu* Alexander) as a coherent group.

PRIMARY COLLECTIONS

There are two major collections of Tipulidae from the Mountain Lake area. The collection and related notes by Rogers are in the Museum of Zoology, University of Michigan, Ann Arbor, Michigan. My collection, field notes, and rearing notes are in the Snow Entomological Division (formerly Snow Entomological Museum), Natural History Museum, University of Kansas, Lawrence, Kansas. The collection of Alexander, basis of much distributional data, is now in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.

DISTRIBUTIONAL REFINEMENTS

There are 26 species distributed primarily in the northeastern United States and nearby Canada that have had their known ranges extended southward, usually by 200 miles (320 km) or more, to the Mountain Lake area:

Ctenophora (Ctenophora) apicata
Nephrotoma calinota
Tipula (Yamatotipula) tephrocephala
Tipula (Pterelachisus) penobscot
Tipula (Beringotipula) inclusa
Tipula (Lindnerina) senega
Tipula (Lunatotipula) hirsuta
Tipula (Lunatotipula) johnsoniana
Tipula (Lunatotipula) monticola
Phalacrocerca tipulina
Limonia (Metalimonia) novaeangliae
Limonia (Dicranomyia) profunda
Antocha (Antocha) obtusa
Ula paupera
Pedicia (Tricyphona) auripennis auripennis
Pedicia (Tricyphona) autumnalis
Dicranota (Eudicranota) pallida
Dicranota (Rhaphidolabis) tenuipes
Paradelphomyia (Oxyrhiza) cayuga
Limnophila (Arctolimnophila) subcostata
Limnophila (Euphyllidorea) fumidicosta
Limnophila (Euphyllidorea) novaeangiliae
Limnophila (Euphyllidorea) fratria
Hexatoma (Eriocera) spinosa
Gonomyia (Gonomyia) bidentata
Ormosia (Ormosia) nimbipennis

Eight more characteristically southern species found farther north than their previously known ranges are:

Limnophila (Elaeophila) seticellula
Limnophila (Euphyllidorea) globulifera
Hexatoma (Eriocera) aurata
Rhabdomastix (Sacandaga) mediovena
Erioptera (Psiloconopa) sweetmani
Ormosia (Ormosia) brevicarata
Ormosia (Ormosia) townesi
Molophilus (Molophilus) floridensis

The ranges of three additional, more typically mid-western species, have been extended substantially to the east into the central Appalachians:

Elliptera illini
Erioptera (Psiloconopa) indianensis
Ormosia (Ormosia) tennesseensis

ANNOTATED CHECKLIST

Family Tipulidae
 Subfamily Tipulinae

1. *Leptotarsus (Longurio) testaceus* Loew

These unusually large crane flies are associated with small, sandy-bottomed brooks, at elevations of 700-1200

m, in which their larvae occur (Alexander, 1919: 191). They occasionally appeared at lights at MLBS. Collected 10-12 and 24-29 June and 3-4, 18-20 July. DC-221, as *Longurio testaceus*. PR-New England southward through the Appalachian Mountains to northern Florida.

A described difference between this species and *L. rivertonensis* (Johnson), in fact the key character that separates their respective subgenera, *Longurio* and *Aeshnasoma*, is that cell M_1 is petiolate in the former but sessile in the latter. Both conditions occur in what otherwise appear to be identical specimens (females) taken at light, MLBS, only a few days apart. Both species have been recorded previously from Virginia.

2. *Ctenophora (Ctenophora) apicata* (Osten Sacken)

Of variable color, this fly is considered by some to be a wasp mimic. Only a few individuals taken in mixed hardwoods near MLBS, 24 July and 1, 8, 13-15, and 28 August. Johannsen (1910) described the larva and pupa. DC-218. PR-southeastern Canada, New England, New York west to Minnesota; Virginia is thus a range extension.

3. *Ctenophora (Tanyptera) dorsalis* Walker

Another species showing variable color and possibly a wasp mimic. Rarely collected, in mixed hardwoods near Mountain Lake, 31 May and 17 June 1969. Larvae beneath bark of dead but only slightly decayed, fallen hardwood trees (Alexander, 1920: 988 as *T. frontalis*). DC-217, as *Tanyptera frontalis*, *T. fumipennis*, *T. topazina*. PR-Newfoundland west to Minnesota and Illinois, south to North Carolina.

4. *Nephrotoma alterna alterna* (Walker)

Long recorded in dipterological literature as *N. incurva* Loew, this is a widespread and not uncommon species. Numerous collections in montane habitats (up to 1175 m), 9-17 and 24-30 June, 8-9 and 22-31 July, 1-2, 9, and 13 August. DC-229 as *N. incurva*. PR-Newfoundland west to Michigan, south to Missouri and northern Florida. A western race, *N. alterna nexilis*, is sometimes recognized, from Manitoba to northern British Columbia, south to Colorado (Oosterbroek, 1984: 147).

5. *Nephrotoma calinota* (Dietz)

Primarily a northern species, this close relative of *N. punctum* was rarely encountered in the Mountain Lake area, in low, herbaceous vegetation along Sinking Creek. One male and two females were taken on 18, 24, and 25 June of three different years. DC-226. PR-New

Hampshire west to northern Michigan, south to Indiana and western North Carolina (Oosterbroek, 1984: 171).

6. *Nephrotoma cingulata* (Dietz)

This conspicuously yellowish orange species is widespread in eastern North America, from near sea level to the Appalachians and beyond (Tangelder, 1983: 176). In some older literature it was confused with *N. xanthostigma*, a synonym of *N. sodalis* (Tangelder, 1983: 172). Collections on 23-29 June, 18-30 July, 2-11 and 31 August. DC-226. PR-Nova Scotia west to Minnesota, south to Arkansas and northern Florida (Tangelder, 1983: 176).

7. *Nephrotoma eucera* (Loew)

Found primarily in valley habitats, in low to medium herbaceous growth. Collections on 23-27 May, 7-14, 17-21 and 28 June, 23 July. Larvae in friable, humus-covered soil near a decayed stump (Young, 1978: 416, as *N. euceroidea*; see Tangelder, 1983). DC-227. PR-Vermont west to South Dakota, south to Arkansas and Georgia (Tangelder, 1983: 146).

8. *Nephrotoma euceroidea* Alexander

One male recorded for the Mountain Lake region by Tangelder (1983: 150), without date. DC-227. PR-Nova Scotia west to Minnesota, south to Tennessee and western North Carolina (Tangelder, 1983: 150).

9. *Nephrotoma ferruginea* (Fabricius)

There are surprisingly few records from the Mountain Lake vicinity for this commonest, most widespread species of North American *Nephrotoma*. Collections on 26-27 May, 13-25 June, 3-5 July, 4 and 15-27 August, 6 September. Because the larvae of *N. ferruginea* can be destructive in gardens, lawns, pastures, and wheat fields, feeding on rootlets of young plants, they long ago received the attention of economic entomologists (e.g., Hart, 1895; Malloch, 1917). Commoner at lower elevations, *N. ferruginea* has been found up to 1400 m in Giles County, usually in grassy areas. DC-227. PR-Newfoundland west across southern Canada, northwestward to southern Alaska, south into central Mexico, Oklahoma, Tennessee, and northern Georgia (see Map 1 in Oosterbroek, 1984: 127).

10. *Nephrotoma gnata* (Dietz)

Following Rogers (in Alexander, 1942) and Alexander (1965), I had regarded this locally rare form as

a synonym of *N. macrocera* and had so identified my four specimens of it (3 and 14 June, 12 July, and 3 August). Dietz had described *gnata* as a subspecies of *N. macrocera*; Tangelder (1983: 170) raised it to species status. DC-230, as a subspecies or synonym of *N. macrocera*. PR-Massachusetts west to Iowa, south to Arkansas, Alabama, and northern Florida (Tangelder, 1983: 170).

11. *Nephrotoma gracilicornis* (Loew)

Only occasionally collected (14 July, 1-4, 9, and 16 August) in shaded, broadleaved vegetation (e.g., jewelweed, nettles); Clover Hollow (2350 ft, 716 m), Doe Creek (3100 ft, 945 m), MLBS (3850 ft, 1174 m). DC-228. PR-Newfoundland west to southern Manitoba, south to Missouri and western North Carolina (Tangelder, 1983: 189).

[*Nephrotoma lugens* Loew]

This species has not been found in the vicinity of Mountain Lake, but its primarily northern range (Nova Scotia to Alberta, south to Montana, Iowa, and northern Virginia) also extends in the Appalachians to western North Carolina and eastern Tennessee.

12. *Nephrotoma macrocera* (Say)

Widespread in eastern United States and one of the more commonly collected tipulids in the Mountain Lake area, this species occurs at elevations from Sinking Creek (534 m) to Wind Rock (1250 m). At every site, the habitat was shaded, usually herbaceous growth but sometimes deep grass, beside flowing water or small marshy areas. Larvae in "wet to saturated silt, rill margins and marshes" (Rogers, 1933: 48). Dates of collection: 19-30 June, 3, 12-13, and 20-23 July, 1 August; there are also regional records for May. DC-229. PR-New Hampshire west to Michigan and eastern Nebraska, south to Oklahoma, Louisiana, and northern Florida (Tangelder, 1983: 169).

13. *Nephrotoma polymera* (Loew)

Primarily a boreal species, seldom collected as far south as western Virginia, this species has been taken in broadleaved plants near water (e.g., Sinking Creek). Collected on 30 May, 7, 13, and 28 June, 12 August. DC-232. PR-Nova Scotia west to North Dakota, south to eastern Kansas, Missouri, and North Carolina (Tangelder, 1983: 154).

14. *Nephrotoma pedunculata* (Loew)

Two males and one female were reported from Giles County, presumably the Mountain Lake area, by Oosterbroek (1984: 180). DC-231. PR-Newfoundland west across southern Canada to Alberta, south to Pennsylvania and western Virginia (Oosterbroek, 1984: 179).

15. *Nephrotoma sodalis* (Loew)

This unusually widespread species was collected in the Mountain Lake region only twice: 8 July and one without date, reported by Tangelder (1983: 184). DC-232. PR-Maine west to southern Manitoba, thence north-westward to central Alaska, south to New Mexico, northern Alabama, and Georgia (Tangelder, 1983: 184).

16. *Nephrotoma suturalis* (Loew)

Found in much the same habitats (i.e., grass and leafy vegetation, usually near a stream) as *N. ferruginea*, which it rather closely resembles. Larvae feed on grass rootlets (Rogers, 1933: 48). Oosterbroek recorded three males and three females from the area. He regarded *N. suturalis* as a subspecies (Oosterbroek, 1984: 127), but I consider it a species distinct from the western *N. wulpiana*. DC-233. PR-New Jersey west to eastern Kansas, south to Texas, Louisiana, and southern Florida.

17. *Nephrotoma subalterna* Oosterbroek

Somewhat more southern than *N. alterna*, this species was originally based largely on specimens from the Mountain Lake vicinity. Its habitats include Wind Rock, MLBS, Doe Creek, Cold Spring, and Bald Knob. Seasonal occurrence 13 and 19-30 June, 2, 9-13, and 26 July, 1-14 August (Oosterbroek, 1984: 147, 148). DC-not included. PR-Appalachians, Virginia to northern Georgia and in cool ravines in Indiana.

18. *Nephrotoma tenuis* (Loew)

Primarily a northern species, *N. tenuis* also occurs southward along the Appalachian Mountains to northern Georgia and Alabama. It is a fairly common species in the Mountain Lake vicinity, from Clover Hollow upward to Bald Knob. Dates of collection: 5-6, 9-13, and 21-27 June, 5-10 and 28-30 July, females only on 2, 6, and 31 August. DC-233. PR-Nova Scotia west to Minnesota, south to Maryland near sea level; extends southward in mountains to Alabama (Tangelder, 1983: 193).

19. *Nephrotoma virescens* (Loew)

Found most often on broadleaved herbaceous vegetation (nettles, jewelweed, *Rubus* brambles, etc.) and on ferns growing in mixed deciduous woods (oaks, maples, hickory, basswood, young chestnut, dogwood). Collected 19-26 June, 2 and 26-29 July, 4-8 and 14-15 August. DC-234. PR-New Hampshire west to Michigan, northeastern Kansas, south to Alabama and northern Florida (Oosterbroek, 1984: 141).

20. *Dolichopeza (Dolichopeza) americana* Needham

Usually seen in its daytime resting places beneath overhanging rocks (as at Cascades), this mainly boreal species also occurs in other shaded, cool, montane habitats. Larvae in damp to relatively dry mosses (Byers, 1961: 792). Collected 5 and 23-27 June, 8-13 July. DC-210. PR-Nova Scotia and coastal Labrador west to southern Manitoba, central Alberta, and central Alaska, south to South Dakota (Black Hills), Arkansas, and northern Georgia (Byers, 1961: 791).

21. *Dolichopeza (Oropeza) carolus* Alexander

More often associated with montane rock outcrops and mesic forests than the superficially similar *D. subalbipes*. Larva unknown, probably in streamside mosses on soil. Adults collected on 3, 12-16, and 21-30 June, throughout July, and 1-15 August. DC-211. PR-Maine west to Wisconsin, south to Indiana and in montane or other cool habitats to northern Florida (Byers, 1961: 803).

[*Dolichopeza (Oropeza) dorsalis* (Johnson)]

Although primarily a boreal species, *D. dorsalis* occurs southward through the Appalachian Mountains, and has been collected in western North Carolina, eastern Tennessee, and even northwestern Florida. It has not been found in the Mountain Lake vicinity but should be there, in marshy areas.

22. *Dolichopeza (Oropeza) johnsonella* (Alexander)

Collected beneath rock ledges (Cascades, etc.) but also in low vegetation along small streams near MLBS at about 1160 m, on 11, 17, and 25-30 June. DC-212. PR-New England and nearby Quebec southwest to western Arkansas, in southern Appalachians and northwestern Florida (Byers, 1961: 819).

23. *Dolichopeza (Oropeza) obscura* (Johnson)

Commonly found in shade of overhanging rocks, as at Cascades, but often in low, broad-leafed vegetation in mesic forests at several elevations. Larvae in a variety of mosses growing in moist habitats (Byers, 1961: 829). Adults taken on 13-30 June, 1-8, 12-17, and 26 July and 1, 15, and 22-26 August. DC-212. PR-Nova Scotia west across southern Canada to western Alberta, south to eastern Kansas and Arkansas to northern Florida (Byers, 1961: 827).

24. *Dolichopeza (Oropeza) polita* (Johnson)

Two geographic races of this species meet and intergrade at various places along the central Appalachian Mountains (Byers, 1961: 837). One such place is the vicinity of Mountain Lake, where the flies are usually associated with shaded niches beneath outcropping rocks (Cascades, Wind Rocks, Bear Cliffs, Garden of the Gods). Larvae in mosses, particularly those on rocks, less often in liverworts (Byers, 1961: 838, 849). Dates of collection of adults: 13, 21-23, and 28-29 June, 2, 13-15 July, 8 and 16-21 August. DC-214 (eastern race). PR-Maine and adjacent Quebec west to Wisconsin, south to Indiana and northern Georgia. (There is also a western race.)

[*Dolichopeza (Oropeza) sayi* (Johnson)]

Has not been found in the Mountain Lake area, but this generally northern species has been collected somewhat farther south in the mountains of Virginia, in Russell County (Byers, 1961: 855).

25. *Dolichopeza (Oropeza) subalbipes* (Johnson)

Similar in coloration to *D. carolus* and sometimes found together with that species, usually in low herbaceous plants near water. Collected 31 May to 24 June. Larvae in moist to wet mosses and a few liverworts (Rogers, 1933: 49). DC-215. PR-New Brunswick west to Minnesota, south to Louisiana and northern Florida (Byers, 1961: 869).

26. *Dolichopeza (Oropeza) subvenosa* Alexander

Described from Great Smoky Mountains, this species is fairly common in the southern Appalachians. It is associated with rock outcrops particularly at high elevations (e.g., Wind Rock). Dates of collection: 4-17 and 24-30 June, 9 July. DC-not included. PR-In moun-

tains from western Maryland (where its range overlaps that of *D. venosa*) to northern Georgia (Byers, 1961: 878, 891).

27. ***Dolichozepeza (Orozepeza) tridenticulata*** Alexander

Common in rock-ledge habitats but also in mesic woodlands in deep shade, occurs at middle to high elevations in Mountain Lake region. Collected 1 and 13-29 June, 2-13 and 20-31 July, 1-8 and 15 August. Larvae in rather dry mosses on rock, at tree bases, and on soil (Byers, 1961: 884). DC-215. PR-Maine west to southern Manitoba, south to Arkansas and northern Georgia (Byers, 1961: 883).

28. ***Dolichozepeza (Orozepeza) walleyi*** (Alexander)

Found in both rocky habitats and in shaded, low to medium herbaceous vegetation, usually near water. It has been collected from Goodwin's Ferry on the New River to the vicinity of MLBS (1174 m), under humid to rather dry conditions. Larvae in moist to rather dry bryophytes (Byers, 1961: 902-903). Collected 7 and 18-28 June, 26 August. DC-216. PR-Nova Scotia west across southern Canada to central Alberta, south to South Dakota (Black Hills), eastern Kansas, and northern Florida (Byers, 1961: 899).

29. ***Tipula (Trichotipula) algonquin*** Alexander

Often found in deeply shaded places beneath overhanging rocks (Cascades, Bear Cliff), also along small montane brooks (Pond Drain, Cold Spring, Hunters Branch). Collected 3 and 20-28 July, 1-7, 12-16, and 24-29 August, 3-4 September. DC-238. PR-Maine west to Michigan, south to Tennessee and North Carolina.

30. ***Tipula (Trichotipula) orozepeoides*** Johnson

Usually swept from broadleaved herbaceous plants on damp to wet soil near heads of brooks, in upland woods near MLBS. Collected 21 and 28 May, 4-5 and 11 June. DC-238. PR-Newfoundland west to Michigan, south to Tennessee and northern Florida.

31. ***Tipula (Trichotipula) unimaculata*** (Loew)

Rarely collected (at light, MLBS, and Doe Creek), in habitats similar to those of *Tipula algonquin*, 12-19 August. The larvae, found in moist to wet mosses and liverworts, were described and illustrated by Gelhaus (1986: 170). DC-239. PR- Maine west to Michigan, south to Illinois and North Carolina.

32. ***Tipula (Shummelia) hermannia*** Alexander

A common species in streamside vegetation from Sinking Creek up to Wind Rock and down to Kire, collected 27-31 May, 1-20 and 23-30 June, throughout July, 1-15 and 19-26 August, 3-7 September. DC-262. PR-Newfoundland and New Brunswick west to Wisconsin, south to eastern Kansas, Tennessee, and northern Florida.

33. ***Tipula (Shummelia) stenorhabda*** Alexander

Some of the dates and places included under *T. hermannia* may pertain to specimens tentatively identified as this species. This form (based on shape of inner dististyle of male) is found especially in montane areas, such as near MLBS.

34. ***Tipula (Shummelia) friendi*** Alexander

Only one male and one female of this species collected from ferns and herbaceous plants near White Rock Branch, White Rocks Forest Service campground, 2950 ft (900 m), 3 June 1977 (GWB #119). DC-262. PR-Massachusetts south to mountainous Tennessee and North Carolina.

35. ***Tipula (Nobilotipula) collaris*** Say

Occasionally found in lush vegetation on wet soil near brooks and seepages (Hunters Branch, Cold Spring, MLBS). Collected 21-22 and 31 May, 3-14 June. DC-239. PR-southern Quebec west to Michigan, south to South Carolina.

36. ***Tipula (Nobilotipula) nobilis*** (Loew)

Uncommonly swept from montane broadleaved vegetation in deciduous woods (MLBS at light, Mud Branch, upper Hunters Branch), 21-22 June. Gelhaus (1986: 152) described and illustrated the larva and its habitat at edges of shallow pools in decaying leaves. DC-240. PR-New Brunswick west to Michigan, south to western North Carolina.

37. ***Tipula (Nippotipula) abdominalis*** (Say)

Adults of this large crane fly are infrequently seen and rarely are collected more than one at a time, usually at lights. Larvae, in contrast, are commonly encountered by limnologists and others sampling decomposing plant material at edges of small streams (Sinking Creek, White Rock Branch) and ponds. The large larva has been

pictured and described, for example, in Peterson's *Larvae of Insects, Part II* (1951: 279, Fig. D8, A, B), in the book by Merritt & Cummins (1996: Fig. 23.9), and in detail by Gelhaus (1986: 149). Adults found on 6, 12, 15, 20, 23 August. DC-241. PR-Newfoundland west to Wisconsin, south to Kansas and Florida.

38. **Tipula (Platytipula) ultima** Alexander

Earliest emergence of adults of *T. ultima* barely overlaps the end of the second summer session at MLBS. Consequently, I never collected this species in the area; Rogers found it only on 15, 26, and 29 August, in habitats where the soil was moist to wet, vegetation lush. Larva, pupa, and their habitat were described by Young (1981), who collected the larvae from silty mud in a hillside seepage area. DC-260. PR-Nova Scotia west to Saskatchewan, south to Wyoming, Mississippi, and Florida.

39. **Tipula (Yamatotipula) caloptera** Loew

Apparently uncommon in the Mt. Lake area, this widespread species was collected at MLBS only on 19 and 20 June; females were taken at light on 20 June. Larva is aquatic; see Gelhaus (1986) and Rogers (1933). DC-250. PR-Newfoundland west to Minnesota, south to Missouri and Florida.

40. **Tipula (Yamatotipula) catawbiana** Alexander

Dr. Rogers collected this species on 20 May at Cold Spring; however, I never found it. It seems to be on the wing in June in western North Carolina (Alexander, 1941: 289). DC-not included. PR-North Carolina and eastern Tennessee; new state record for Virginia and northward range extension.

41. **Tipula (Yamatotipula) cayuga** Alexander

A species of upland habitats, *T. cayuga* was collected along Pond Drain and Hunters Branch, also on Bald Knob, 17 and 23-27 June, 13 August. DC-250. PR-Newfoundland west to Michigan, south to Tennessee.

42. **Tipula (Yamatotipula) concava** Alexander

Occasionally found in low vegetation along Sinking Creek and at the south of Spruce Run on New River, 22, 25 May, 18 June and 26 August, but once collected much higher, at MLBS, on 15 June. DC-251. PR-Maine west to Michigan, south to Missouri and Tennessee.

43. **Tipula (Yamatotipula) eluta** Loew

At light, MLBS, 2-3 July. DC-251. PR-New Brunswick west to Illinois, south to northern Florida.

44. **Tipula (Yamatotipula) furca** Walker

I found this common, widespread species only rarely (12, 13, and 14 August), in a marsh habitat beside a small pond at MLBS; oddly, it was not collected by Rogers. DC-253. PR-Maine and Quebec west to Wisconsin, eastern Kansas, south to Texas and Florida.

45. **Tipula (Yamatotipula) iroquois** Alexander

Collected from streamside vegetation along Pond Drain and near Little Stony Creek. Collected 23-24 and 31 May, 8 June. DC-253. PR-Newfoundland south to North Carolina and Tennessee.

46. **Tipula (Yamatotipula) jacobus** Alexander

Collected at lights at MLBS, 16-30 June and 2 July, and from herbaceous vegetation along Hunters Branch and Mud Branch, 22-26 June, 7-9 July. DC-254. PR-Nova Scotia south to eastern Tennessee and Florida.

47. **Tipula (Yamatotipula) strepens** Loew

A male collected beside Mud Branch, near MLBS, on 17 June; identified with some question because of range (cf. *T. calopteroides* Alexander). DC-255. PR-Newfoundland west to Kansas, south to New Jersey.

48. **Tipula (Yamatotipula) tephrocephala** Loew

A boreal species taken at light at MLBS and from ferns and leafy vegetation along nearby Mud Branch on 24 May, 8 and 21-23 June. DC-256. PR-Newfoundland west to Minnesota, south to Pennsylvania; thus the MLBS records are new for the region.

49. **Tipula (Yamatotipula) tricolor** Fabricius

The most commonly collected species of the subgenus *Yamatotipula* in the Mt. Lake area, *T. tricolor* was flying 25-27 June, 2-7, 18-22, and 28-30 July and 5-12 August and was quite common on 30 July, both at lights (MLBS) and in streamside vegetation (Mud Branch). DC-257. PR-Maine and southern Quebec west to Minnesota, south to Arkansas and Florida.

[**Tipula (Vestiplex) longiventris** Loew]

This species has been found near Highlands, North Carolina (Alexander, 1941:294) and probably occurs in the Mountain Lake area but so far has not been collected there.

50. **Tipula (Pterelachisus) angulata** Loew

Only occasionally found in mesic woods near MLBS, such as near Mud Branch, or at light, on 19, 21, 23, and 24 June. DC-270. PR-New Brunswick west to Minnesota, south to Illinois and New York. A subspecies, *T. angulata cherokeana* Alexander, was found at higher elevations in eastern Tennessee and western North Carolina. The specimens from western Virginia appear to belong to this southern subspecies. See Byers (1979: 607) concerning the possible synonymy of *T. angulata* and *T. subfasciata* Loew.

51. **Tipula (Pterelachisus) entomophthorae** Alexander

Collected fairly commonly in upland mesic woods (MLBS, Hunters Branch, Wind Rock), much less often at lower elevations (Sinking Creek). Collected 22, 30-31 May, 1-4, 12, and 17-30 June, 2, 8, and 23-25 July. Occasionally taken at lights (MLBS). DC-270. PR-Labrador west to Alberta, south to Indiana and North Carolina.

52. **Tipula (Pterelachisus) penobscot** Alexander

I found this species only once – a male in low herbaceous plants at edge of woods near the pond at MLBS, on 23 June 1969. DC-272. PR-New Brunswick west to Alberta, south to Michigan and Pennsylvania. The known range is herewith extended southward in the Alleghanies, and this species added to the tipulid fauna of Virginia.

53. **Tipula (Pterelachisus) trivittata trivittata** Say

Found both at lower elevations (e.g., near Kire, about 3 km north of Wind Rock, on Stony Creek, and in various more montane places (MLBS, Mud Branch, Bald Knob) among ferns and leafy vegetation. Dates of collection: 23-27 May, 1-19 and 25-27 June, 9 July and 10 August. Gelhaus (1986: 147) commented that “most of the ... larvae of *T. trivittata* are from well-rotted logs and stumps (of deciduous trees), generally under the bark or under mosses.” DC-275. PR-Newfoundland west to Minnesota, south to Tennessee and South Carolina.

54. **Tipula (Beringotipula) borealis** Walker

Primarily a late summer species in upland mesic forest (MLBS, Hunters Branch, Pond Drain). Collected 1-2 and 26 July, 5, 9-12, and 20-26 August, 4 September. DC-265. PR-Nova Scotia west to Minnesota, south to Kansas and South Carolina.

55. **Tipula (Beringotipula) inclusa** Dietz

Collected only once in the Mt. Lake vicinity, by Rogers, at the mouth of Spruce Run on the New River near Goodwins Ferry, on 26 August. DC-266. PR-Pennsylvania only; accordingly this is a new state record and southernmost known for this scarce species.

56. **Tipula (Lindnerina) senega** Alexander

This is primarily a boreal species, found rather commonly on 21-31 May, 1-8, 14-17, and 21-27 June, in several habitats near MLBS, such as Hunters Branch, Cold Spring, Clover Hollow, and Pond Drain. DC-272. PR-Newfoundland west to Alberta, south to Iowa and New Jersey; accordingly this is a new record for the state and a major extension of the known range south through the Appalachian Mountains.

57. **Tipula (Savtshenkia) ignobilis** Loew

Rarely taken in the Mt. Lake vicinity (Cascades, Pond Drain), on 11 June and 2 July. Larvae of *T. ignobilis* have been collected from wet mosses in shaded environments and were described and illustrated by Gelhaus (1986: 159). DC-267. PR-New Brunswick west to Illinois, south to Tennessee and North Carolina.

58. **Tipula (Lunatipula) apicalis** Loew

Most of my records of this distinctive fly are for the near vicinity of MLBS, although I once collected it at Wind Rock. Collected 2-3, 8-15, 19-21, and 29 June. Several collections were at lights. DC-283. PR-Nova Scotia west to Michigan, south to Tennessee and North Carolina.

59. **Tipula (Lunatipula) bicornis** Forbes

A fairly common species in most parts of its range but only found a few times at lower elevations in the Mt. Lake area, on 22 and 30 May, at Sinking Creek and Goodwin's Ferry. DC-277. PR - New Brunswick west to Wisconsin, south to Kansas, Tennessee, and Virginia.

60. **Tipula (Lunatipula) duplex** Walker

This is one of the commonest Tipulas in the Mt. Lake area, collected at a low elevation (Sinking Creek) and at middle to high elevations (Cold Spring, Hunters Branch, Wind Rock, Bald Knob). Often common at lights (e.g., 1973). Extremely abundant in woods near MLBS in early July 1990. Collected 26 June, 2-7 and 18-30 July, 1-16 August. Larvae “in moist, friable soil” beneath decomposing leaf litter or dead wood (Rogers, 1933: 45).

DC-285. PR-Nova Scotia west to Minnesota and Kansas, south to northern Florida.

61. **Tipula (Lunatipula) fuliginosa** (Say)

Rogers obtained most of his specimens at lights (MLBS); in 1969 I found this species common at Wind Rock, 19 June. Other dates 1 and 26-27 June. The larva was described and illustrated by Gelhaus (1986: 144) from specimens collected in oak-hickory woods from upper soil beneath “a thick layer of leaf litter.” DC-280. PR-New Hampshire and Ontario west to Kansas, south to North Carolina.

62. **Tipula (Lunatipula) hirsuta** Doane

Not recorded in the central Appalachians before, this large crane fly, similar to *T. valida*, was not uncommon in low vegetation and at lights at MLBS; also taken at Doe Creek, Cold Spring, and in Clover Hollow. Collected 7-19 and 26-29 June. DC-287. PR-Vermont west to Wisconsin, south to Pennsylvania. While specimens from Virginia are thus a new state record, I have collected this species farther to the south and west, in Kentucky and Tennessee.

63. **Tipula (Lunatipula) johnsoniana** Alexander

Collected at light more often than in its natural habitat (e.g., Doe Creek) and only on 18, 24, 26, and 28 June. DC-277. PR-Vermont, Massachusetts, and Maryland. Occurrence in southwestern Virginia constitutes a range extension of some 200 miles (320 km).

64. **Tipula (Lunatipula) mallochi** Alexander

Found only occasionally, but at elevations from Sinking Creek to Cold Spring to Bald Knob, in leafy herbaceous growth in woodlands. Dates of collection: 23 and 31 May, 18-19 and 26-28 June. DC-289. PR- Maryland west to Missouri, south to northern Florida.

65. **Tipula (Lunatipula) monticola** Alexander

Not an uncommon species in such habitats as Cold Spring, Wind Rock, or Mud Branch and MLBS, taken on 1-2, 11, and 14-26 June. DC-289. PR-Maine west into Ontario and south to Pennsylvania; thus the Mt. Lake records are new for the state and the southernmost known for the species.

66. **Tipula (Lunatipula) submaculata** Loew

In some years (e.g., 1990) *T. submaculata* was very common on the grounds of MLBS in mid-June, and several mating pairs were collected. The species was also often taken at lights at MLBS. Dates of collection: 10-30 June, 2-8 and 20 July. Found from Sinking Creek to Pond Drain and Hunters Branch. DC-290. PR-Nova Scotia west to Wisconsin, south to Tennessee and South Carolina.

67. **Tipula (Lunatipula) translucida** Doane

Occasional in the Mt. Lake area in low herbaceous vegetation, such as shaded, streamside plants along Sinking Creek; also at higher elevations. Collected 22 May, 6-8, 18-19, and 28 June, 9 August. DC-290. PR-Pennsylvania west to Illinois, south to Oklahoma and South Carolina.

68. **Tipula (Lunatipula) tuscarora** Alexander

Collected once by Rogers, in vegetation along Hunters Branch, on 10 June. DC-291. PR-Maryland west to Missouri, south to South Carolina.

69. **Tipula (Lunatipula) valida valida** Loew

This large *Tipula* was collected at lights (MLBS, 12-21 June) more often than in its natural environment. In early morning of 14 and 15 June 1990, both males and females were numerous on the lawn of MLBS, but no mating pairs were seen (cf. *T. submaculata*, common in the same season). There was heavier rainfall than usual in spring 1990, which may have affected the abundance of crane flies in summer. Also collected at Cold Spring and Hunters Branch on 26 and 31 May, 10-19 and 26 June. An individual collected on 19 June had antennomeres not distinctly bicolorous; cf. *T. valida atricornis* Alexander (1941: 295) of western North Carolina. DC-291. PR-Newfoundland west to Minnesota, south to Illinois and North Carolina.

70. **Tipula (Triplitipula) flavoumbrosa** Alexander

Males of this species were taken at light (MLBS) on 12, 14, and 17 June 1990, and a female on 16 June. A large male, probably of this species, with wing length 25 mm, collected 14 June 1990, has atypical submedian teeth on sternum 8. These are slender, distinctly curved, and with somewhat twisted appearance, suggesting *Tipula perlongipes* Johnson, but the depressed median lobe in that species is not present. Rogers (1933: 45) described the larval habitat in northern Florida as "sandy loam of hammock floor, among roots of grasses and herbage." DC-286 (as *Lunatipula*). PR-Michigan west to eastern Kansas, south to South Carolina and Florida.

71. **Tipula (Triplitipula) triplex** Walker

A very common crane fly in many parts of its wide range, it has appeared rather briefly near MLBS (Mud Branch, Hunters Branch, Cold Spring, and Sinking Creek) from 19 to 27 May and 7 and 14 June. Rogers (1933: 47) found larvae in "damp to wet surface soil of low wooded areas." I have found the larvae in moist but never wet soil, near the surface, at the edge of woods or in nearby grassy areas. Gelhaus (1986: 173) described and illustrated the larva. DC-290 (as *Lunatipula*). PR-Newfoundland west to Alberta, south to Wisconsin and Virginia. Alexander has described two subspecies from eastern Tennessee.

Subfamily Cylindrotominae

72. **Phalacrocer a tipulina** Osten Sacken

Two of the habitats in which Rogers collected this species were characterized by *Sphagnum* moss with nearby deep grasses and clumps of ferns. All three were shaded seepage areas. Dates of collection: 5, 12, and 18 June. The aquatic larvae were found by Rogers in 1920 but never formally described; they resemble larvae of the European *P. replicata* (Alexander, 1920: 962, plate 83). DC-293. PR-Newfoundland west to Wisconsin, south to Pennsylvania. Rogers' collections thus are new for the state as well as the southernmost known for the species.

73. **Liogma nodicornis** (Osten Sacken)

Adults were found at altitudes from Sinking Creek and Kire up to Hunters Branch and MLBS, in moist to boggy habitats. Dates: 13-14 and 21-25 June. I reared adults from larvae found in mosses (*Mnium punctatum* and *Hypnum cupressiforme*) beneath shrubs at MLBS. The larva was described by Alexander (1920: 969, plate 85) and more recently by Alexander & Byers (1981: 180,

fig. 65). Alexander (1919: 195) named a subspecies *L. nodicornis flaveola* from northern Virginia (near D.C.), based largely on minor color differences from the more usual specimens. In the Mt. Lake area, however, specimens vary; some could be assigned to one subspecies, some to the other. Brodo (1967: 105) accordingly synonymized subspecies *flaveola* with the nominate form. DC-295. PR-Newfoundland west to Alberta, south to Illinois, Tennessee, and North Carolina.

Subfamily Limoniinae

74. **Limonia (Limonia) globithorax** (Osten Sacken)

Collected only in upland mesic woods along small streams (Pond Drain, Hunters Branch, Mud Branch), on 9 and 21 June, 2-25 July, 1 and 23-29 August, 12 September. Larvae in fungus growing on decomposing logs (Rogers, 1930: 29, as *Dicranomyia*). DC-304. PR-Newfoundland west to Wisconsin, south to Tennessee and Florida.

75. **Limonia (Limonia) indigena indigena** (Osten Sacken)

A common and widespread subspecies, found occasionally along Sinking Creek but often in lush vegetation in mesic woods at higher elevations (Cascades, Cold Spring, Hunters Branch, Pond Drain). Dates of collection: 4-30 June, 1-28 July, 4-17 and 23-29 August. DC-304. PR-Newfoundland west to Wisconsin, south to Iowa, Tennessee, and South Carolina.

76. **Limonia (Limonia) macateei** (Alexander)

Occasionally collected in lush vegetation in seepage areas along a small stream (Clover Hollow). There appear to be two distinct generations, based on collections of 7 and 25 June and 22 and 29 August. Rogers reared adults of *L. macateei* from decomposed fungus (*Polyporus tsugae* ?) that had dropped beside a rotten log at the Garden of the Gods site; fungus collected 20 July. Larvae from the slimy upper surface of the fungus and supposedly of this species have not been described. DC-305. PR-Maine west to Indiana, south to Tennessee and Florida.

77. **Limonia (Limonia) maculicosta** (Coquillett)

This unusually widespread species was rarely collected in the Mt. Lake area, at light, MLBS, on 29 June and 1 August, and once (by Rogers) on the damp walls of Tawney's Cave, in total darkness, 24 June. DC-305. PR-Vermont northwestward to Alaska, south to California

and Virginia.

78. **Limonia (Limonia) parietina** (Osten Sacken)

A primarily boreal species, said to be associated often with wooded cliffs (Alexander, 1942: 306) but taken only at light, at MLBS, on 15 June and 26 August. DC-306. PR-Maine west to Michigan, south to Illinois and North Carolina.

79. **Limonia (Limonia) tristigma** (Osten Sacken)

This common and widespread species was sometimes extremely numerous (Cascades, Bear Cliffs, Hunters Branch, etc.). I recorded it in field notes of 2 August 1979, at Wind Rock, as present "by thousands, all through the woods, on rock cliffs, etc." Dates of collection: 22-23 June, many days between 2 and 30 July, 1-27 August. Rogers reared adults from larvae found in thin, compact layers of black humus beneath mosses, on rocks, and on the underside of a decayed hemlock log (between log and loose bark) at Garden of the Gods. The larvae have not been described. Dr. Ritchie Bell found adults of *L. tristigma* on flowers of *Angelica triquinata* and supposed they were among the insect pollinators of that umbelliferous plant. DC-308. PR-New Brunswick west to Alberta, south to Tennessee and North Carolina.

80. **Limonia (Metalimnobia) annulus cinctipes** (Say)

A very widespread and often common crane fly, *L. a. cinctipes* has been surprisingly uncommon near Mountain Lake, with collections on 27 May, 1 and 9-19 June, 28 July, and 20-25 August. Some individuals were taken at light (MLBS near Mud Branch). Rogers (1933: 50) found the larvae "in fleshy fungi on wet rotten logs and stumps - mainly *Poria* or *Polyporus* - either in the body of the fungus or the mycelia-filled wood at its base." DC-300. PR-Newfoundland west to Alberta, south to Mississippi and Florida. Two unusually large males (wings 22, 23 mm), apparently of this subspecies but lacking transverse bands on abdominal terga, were collected along Doe Creek (elevation 762 m) on 11 July 1990.

81. **Limonia (Metalimnobia) fallax** (Johnson)

Collected at MLBS and upper Doe Creek, 27 May, 17 and 26 June, 26 July, 4 and 14 August. Alexander (1920: 813) described both the larva and pupa. DC-301. PR-New Jersey west to Michigan, south to Oklahoma and North Carolina.

82. **Limonia (Metalimnobia) immatura** (Osten Sacken)

Adults were collected from shaded, streamside vegetation at very different elevations (Hunters Branch, Sinking Creek) on 25 May, 17 and 26 June, 1 and 26 July and 7-23 August. Larvae were found in fungus growing on a fallen log of horse chestnut lying across a small brook in Clover Hollow, later reared to adults. Larvae probably in fungi and decaying wood (Alexander, 1920: 810). DC-304. PR-Maine west to British Columbia, south to northwestern Florida.

83. **Limonia (Metalimnobia) novaengliae** Alexander

My own collecting failed to yield this generally northern species, but Rogers recorded it on 18 June and 12 August from Hunters Branch. DC-305. PR-Maine to New York; thus, Rogers' records are new for the state, and represent a very extensive southward extension of the species' known range.

84. **Limonia (Metalimnobia) triocellata** (Osten Sacken)

A common species in the Mt. Lake area, found chiefly among broad-leaved herbaceous plants and ferns along streams and on nearby slopes (Hunters Branch, Mud Branch, MLBS, Little Stony Creek, Sinking Creek), also taken at lights. Dates of collection: 28 May, 8-10 and 21-30 June, 2-14 and 22-28 July, 1-5 and 12-30 August, and 4-10 September. Larvae have been found in several kinds of fungi; larva and pupa were described by Malloch (1917) and Alexander (1920: 814, fig. 94). DC-308. PR-Nova Scotia west to Alberta, south to Tennessee and Georgia.

85. **Limonia (Discobola) annulata** (Linnaeus)

Present at several sites and on numerous dates, this species was never abundant; collected at Cascades, Hunters Branch, Mud Branch, MLBS (at light), etc., on 5 and 24-28 June, 1-7 and 13 July, 1-2, 9-20, and 26 August, 5 September. DC-309. PR-Newfoundland west to British Columbia, south to Oregon, Tennessee and Virginia; also widespread in Eurasia.

I collected one female, at Cold Spring, 11 August, that fits the original description of *L. nigroclavata* (Alexander, 1942: 310), but considering the scant northern records (Maine to New York) for that species I regard this specimen as only a variant of *L. annulata*.

86. **Limonia (Rhipidia) domestica** (Osten Sacken)

Largely neotropical and only occasionally collected near Mt. Lake, in streamside vegetation (e.g., Sinking

Creek, Little Stony Creek); dates, 13 June, 1 and 29 August. DC-328. PR-New Jersey west to Iowa, south to Texas and Florida and in the Neotropical Region.

87. ***Limonia (Rhipidia) duplicata*** (Doane)

Most often found in streamside vegetation (Pond Drain, Doe Creek, Mud Branch, Hunters Branch, Little Stony Creek, and MLBS at light). Dates of collection: 27 May, 21-30 June, 2-7 and 19-31 July, 1-14 and 19-29 August. DC-328, as *L. maculata*. The name *maculata* Meigen 1818 was found to be preoccupied, and for a time the species was known as *L. lecontei* (Alexander, 1940); however, that name has now been judged synonymous with *L. duplicata* (Doane, 1900). PR-Newfoundland northwestward to Alaska, south to California, Tennessee; also in the Palearctic Region.

88. ***Limonia (Rhipidia) fidelis*** (Osten Sacken)

Only scattered collections (MLBS, Hunters Branch), some at light, on 25 May, 28 June, 8 and 15-16 July. DC-328. PR-Nova Scotia west to Alberta, south to Oregon, Tennessee, and Florida.

89. ***Limonia (Rhipidia) shannoni*** (Alexander)

Rare in this region, collected only once, by Rogers, beside Pond Drain, on 23 August. DC-329. PR-Maryland west to Illinois, south to Florida; also neotropical.

90. ***Limonia (Dicranomyia) divisa*** Alexander

A fairly common crane fly in upland mesic woods, on low plants near streams (Hunters Branch, Mud Branch, Cold Spring, Clover Hollow); also taken at light (MLBS). Dates: 19 May, 6-9 and 20-27 June, 4, 9, and 28 July, 11 August. On 4 August Rogers collected mosses from rocks in seepage areas of Clover Hollow, and a week later found seven adults of *L. divisa* as well as several *L. morioides* had emerged from these. The larvae have not been described. DC-315. PR-Massachusetts west to Iowa, south to Missouri and Florida; also in upper montane habitats of Greater Antilles.

91. ***Limonia (Dicranomyia) gladiator*** (Osten Sacken)

Collected only occasionally in late summer and chiefly at lower elevations (Goodwins Ferry, Spruce Run at New River, Little Stony Creek), on 26-29 August, 12 September. DC-318. PR-Maine west to Alberta, south to Colorado and Georgia.

92. ***Limonia (Dicranomyia) humidicola*** (Osten Sacken)

I have found this species mainly in shaded, rocky habitats, such as the Cascades of Little Stony or Wind Rock; it was also found at Cold Spring and Goodwins Ferry. Dates: 22 and 27-30 May, 1 and 30 June, 9, 15, and 26 July, 3, 14-16, and 28 August. DC-319. PR-Nova Scotia west to British Columbia, south to California, Tennessee, and South Carolina; also in mountains as far south as Central America.

93. ***Limonia (Dicranomyia) liberta*** (Osten Sacken)

This is probably the most frequently collected species of its genus and subgenus in North America, found at all elevations in the Mt. Lake area and in a variety of habitats (Goodwins Ferry, Sinking Creek, Clover Hollow, Hunters Branch, Mud Branch, MLBS). Dates: 19-28 May, 6-9 and 21-26 June, 5, 10-12, and 22 July, 4, 13-18, and 26-30 August. DC-320. PR-Newfoundland west to Manitoba, south to Oklahoma and Florida; also occurs in Bermuda.

94. ***Limonia (Dicranomyia) morioides*** (Osten Sacken)

Found chiefly at lower elevations in the region (Cascades, Sinking Creek, Goodwins Ferry). Dates of collection 22-30 May, 23 and 29 June, 11, 17, and 28 August. Rogers reared several adults from mosses on rocks in seepage areas of Clover Hollow. Larvae not described, live in mosses; see *L. (D.) divisa*, above. DC-321. PR-Nova Scotia northwestward to Alaska, south to Colorado and North Carolina.

95. ***Limonia (Dicranomyia) profunda*** (Alexander)

A largely boreal species, taken only in late spring (8-17 June) on meadows along Little Stony Creek. DC-321. PR-Newfoundland west to Quebec south to New York; accordingly our few records are new to the state and extend the known range far southward in the Appalachians.

96. ***Limonia (Dicranomyia) pudica*** (Osten Sacken)

Recorded from upland mesic woods (Mud Branch, Hunters Branch, Cold Spring) and at light (MLBS), on 25-29 May, 2-13 and 20-28 June, and 30 August. DC-324. PR-Maine west to Michigan, south to Illinois and North Carolina.

97. ***Limonia (Dicranomyia) pudicoides*** Alexander

Rarely found in the area (12 July and 4 September) at MLBS and near the south fork of Hunters Branch. Rogers

(1930:30-31) described the larval-pupal habitat in detail. The larvae construct “gelatinous tubes among or beneath the saturated algae and mosses.” He found the immatures “present in large numbers, scores of larvae and pupae in a square foot of algae.” DC-324. PR-Maine west to Indiana, south to Tennessee and North Carolina.

98. ***Limonia (Dicranomyia) spinifera*** (Alexander)

All collections of this species have been at upper elevations in the region (MLBS, Cascades, Hunters Branch, etc.). Dates: 14-26 July, 26-29 August. DC-324. PR-New Brunswick west to Michigan, south to North Carolina.

99. ***Limonia (Dicranomyia) stulta*** (Osten Sacken)

Although widely distributed, *L. stulta* was only occasionally collected but in several places (Cascades, Sinking Creek, Little Stony Creek, Cold Spring, Hunters Branch). Dates: 3, 12, and 20-27 June, 6 July, 17 August. “The larval habitat is precisely that of ... *pudivoides* and the larvae and pupae ... were abundant in the same mats of wet algae” (Rogers, 1930: 32). Alexander (1920: 822) described the larva. DC-325. PR-Maine west to Wisconsin, south to Georgia.

100. ***Limonia (Dicranomyia) uliginosa*** Alexander

Streamside herbaceous growth appears to be the habitat of this species, collected along Sinking Creek, Mud Branch, Hunters Branch, and meadows along Little Stony Creek. Dates: 30 May, 2 and 9-17 June, 10 July. DC-325. PR-Quebec west to Michigan, south to Tennessee and South Carolina.

101. ***Limonia (Geranomyia) communis*** (Osten Sacken)

Distribution of this and other species of the subgenus *Geranomyia* is probably strongly influenced by the availability of appropriate flower blossoms, but this has not been studied in detail. Only scattered records are available in the Mt. Lake area, such as near Sinking Creek. Dates of collection: 22 June, 22 July, 16 and 30 August. DC-330. PR-Newfoundland northwestward to Alaska, south to California and Florida.

Note: There has long been some confusion of this species with *Limonia canadensis* (Westwood), which occurs from Quebec west to Minnesota, south to Texas and northern Florida, and is likely to be found in the Mt. Lake vicinity.

102. ***Limonia (Geranomyia) diversa*** (Osten Sacken)

A widespread species only occasionally found in this region (Cascades, Cold Spring, Hunters Branch), on 23 June, 9 and 16 July and 4 September. Adults were found, probably near larval habitats, where there are shaded rocks overgrown with algae and mosses. In Tennessee, Rogers (1930: 33) found larvae and pupae abundant in wet algae growing on shaded cliffs. The larva secretes a gelatinous tube and protrudes from it to feed at the algal surface. DC-330. PR-Maine west to Oregon, south to California and South Carolina.

103. ***Limonia (Geranomyia) rostrata*** (Say)

Rare in the Mt. Lake area and only twice collected at the shore of an artificial pond and near Mud Branch (both MLBS), on 7 and 19 August. Rogers (1930: 34) also found the adults uncommon, the larvae in wet mosses and liverworts on rocks or on soil of stream banks. DC-332. PR-Newfoundland west to Michigan, south to Louisiana and Florida; also in the Greater Antilles.

104. ***Limonia*** (not placed in subgenus) ***fusca*** Meigen

Collected from streamside vegetation, along Hunters Branch, Pond Drain, White Rock Branch, and Little Stony Creek, on 22 May, 14, 19 and 25-27 June, 25 July, 1-4 and 20-24 August. DC-301. PR-Newfoundland west to Michigan, south to Georgia.

105. ***Antocha (Antocha) obtusa*** Alexander

Like other species of *Antocha*, this one is found in herbaceous vegetation along streams near places where the water flows swiftly among partially submerged rocks (mouth of Spruce Run at New River, Sinking Creek near Tawney’s Cave); also attracted to lights (Mud Branch vicinity). Dates of collection: 21-22 and 30 May, 8 and 21-25 June, 2 July, 26 August. Larvae aquatic, in algae on rocks in riffles. DC-324. PR-Quebec west to Michigan, south to New York; these Virginia records are new for the state and represent a southward extension of about 500 miles (800 km) along the Appalachians.

106. ***Antocha (Antocha) opalizans*** Osten Sacken

Collected from streamside vegetation (Sinking Creek, Little Stony Creek, Hunters Branch) and frequently at lights that are near water (MLBS, light trap near Hunters Branch). Dates: 22-27 May, 17-29 June, 4-10 July. Larva of *Antocha* sp. is illustrated by Alexander & Byers (1981: 182, fig. 74). DC-335. PR-Maine west to Wisconsin, south to Georgia.

107. **Antocha (Antocha) saxicola** Osten Sacken

Found in herbaceous streamside vegetation (Sinking Creek, Little Stony Creek, Big Stony Creek), particularly near riffles; also occasionally at lights. Dates: 22-29 May, 7-11 and 18-24 June, 2, 11, and 18-22 July, 30 August. Larvae and pupae were described by Alexander (1920: 803-805, plates 20-22). DC-335. PR-Newfoundland west to Michigan, south to Missouri and Georgia.

108. **Elliptera illini** (Alexander)

Rogers collected flies identified as this species at the Cascades of Little Stony Creek, certainly an appropriate habitat. He provided information about larval, pupal, and adult occurrence in the Cumberland Plateau region of Tennessee (Rogers, 1930: 25-27). Dates: 11 and 23 June. DC-336. PR-Tennessee, Illinois; Mt. Lake specimens extend the known range somewhat eastward, adding Virginia to the states inhabited by the species.

109. **Dicranoptycha germana** Osten Sacken

Collected from various streamside habitats (Little Stony Creek, Cascades, Hunters Branch, Pond Drain) in upland woods. Dates: 25 May, 17-28 June, 1-7 and 17 July, 15 August. DC-327. PR-Quebec west to northern Minnesota, southward in Appalachian region to South Carolina.

110. **Dicranoptycha megaphallus** Alexander

Primarily a southern species, not found at higher elevations but in herbaceous growth along Sinking Creek, only on 4 and 24 June. The larva and pupa were described and well illustrated by Young (1987: 224). Rogers (1933: 50) described the larval habitat as "moderately dry, plastic soil of well drained woods." DC-337. PR-western Virginia west to eastern Kansas and Oklahoma, south to Louisiana and northern Florida.

111. **Dicranoptycha septentrionis** Alexander

This late summer species was once collected by Rogers near the mouth of Spruce Run (Goodwins Ferry), and I occasionally took it at light (MLBS) and once near Doe Creek. Dates: 29 July, 9-12 and 25 August, 5 September. DC-338. PR-Massachusetts west to southern Michigan and eastern Kansas, south to western North Carolina and northern Georgia.

112. **Dicranoptycha sobrina** Osten Sacken

Although this species is widespread in eastern United States, it has been found only twice near Mountain Lake, for example, near Sinking Creek, on 18 June and 2 July (not 18 June to 2 July; cf. Young, 1987: 250). Larval habitat, according to Rogers (1933: 50) is "moderately moist, rather friable soil of open woods." DC-339. PR-Maryland west to northeastern Kansas, south to Alabama and central Florida.

113. **Dicranoptycha spinifera** Young

A common spring and early summer species in the region, *D. spinifera* had been mistaken for *D. acanthophallus* by Rogers. Young (1987: 250) limited the type series to specimens collected near Mt. Lake. The habitat is herbaceous growth in mesic woodlands, at elevations from Sinking Creek and Clover Hollow up to MLBS and down to Kire (type locality is White Rock Branch, White Rocks Forest Service campground near Kire). Dates: 27-31 May, 2-28 June, 1-6 July. DC-not included; see Young (1987). PR-Pennsylvania to northern Georgia.

114. **Dicranoptycha tennesa** Alexander

Known only from the type locality in Knox Co., Tennessee, for 46 years, this crane fly was found by Young (1987: 252) to be widespread in the southeastern states. In the Mountain Lake area, its seasonal occurrence was described as 26 June to 15 July. DC-not included; see Young (1987). PR-Pennsylvania southwestward to Kentucky, south to Alabama and South Carolina.

115. **Dicranoptycha winnemana** Alexander

Only occasionally collected from low vegetation (Clover Hollow, Bald Knob), 9-15 July, according to Young (1987: 256). Rogers, in his notes, recorded *D. winnemana* also on 28 July and 4 August. He also described the larval habitat as "moist, friable surface soil of adult habitat, beneath leaf mould; larvae feed on rootlets of herbage."

116. **Ula elegans** Osten Sacken

This widespread species has been collected near Mt. Lake only from upland habitats (Pond Drain, Garden of the Gods, Hunters Branch). Alexander (1942: 343) says of this genus "the immature stages ... are found in

decaying fungi,” and further notes that the adult flies are often swept from “low-growing evergreen shrubs in cold woods and ravines.” Dates of collection: 23-27 May, 2-12 and 21 June, 22-28 August and 5 September. DC-343. PR-Nova Scotia northwestward to Alaska, south to Wyoming and South Carolina.

117. ***Ula paupera*** Osten Sacken

Like the previous species of *Ula*, widespread and essentially boreal (Pond Drain, Hunters Branch, Garden of the Gods), collected on 20-29 May, 5-9 June, 1 and 23-29 August, 3-10 September. See comments under *Ula elegans*. DC-344. PR-Newfoundland northwestward to Alaska, south to California, Wyoming, and New York. Records from the Mt. Lake area are thus new for the region.

118. ***Pedicia (Pedicia) albivitta*** Walker

Apparently an uncommon species near Mt. Lake, taken only twice by Rogers (Little Stony Creek, Hunters Branch) and twice by me (MLBS, at light); dates 15 June, 26 July, 15 and 20-26 August, 4 September. DC-345. PR-Newfoundland west to Manitoba, south to Missouri and South Carolina.

119. ***Pedicia (Pedicia) margarita*** Alexander

Another seldom collected species (Hunters Branch, Cold Spring, MLBS - at light), taken on 21 May, 13-27 June, 15 and 27 August. DC-346. PR-Newfoundland south to Tennessee (Great Smoky Mts.).

120. ***Pedicia (Tricyphona) auripennis auripennis***
(Osten Sacken)

Again, an uncommonly collected species with only scattered records, found near White Pine Lodge on upper Little Stony Creek, also at Cold Spring, on 24 and 30-31 May and 3 June. DC-348. PR for the typical subspecies-Nova Scotia west to southern Ontario, south to New York. Alexander (1941: 299-300) described subspecies *attenuata* from mountainous western North Carolina and subspecies *nephophila* from the Great Smoky Mountains National Park, westernmost North Carolina and eastern Tennessee. The Virginia specimens appear to belong to the typical northern form.

121. ***Pedicia (Tricyphona) autumnalis*** (Alexander)

Had we remained longer at MLBS in the fall, we would surely have more records for this mainly boreal species that is not uncommon in its more northern range.

Found in Moonshine Dell, near MLBS, 5 September. DC-348. PR-New Brunswick west to Ontario, south to Wisconsin and Pennsylvania. The Virginia record accordingly represents a significant range extension of about 400 miles (640 km) southward.

122. ***Pedicia (Tricyphona) calcar*** (Osten Sacken)

A fairly common late-spring species near upland streams (Hunters Branch, Mud Branch, 21-31 May, 4-10 June). DC-349. PR-Newfoundland west to Wisconsin, south to South Carolina.

123. ***Pedicia (Tricyphona) inconstans inconstans***
(Osten Sacken)

By far the commonest *Pedicia* in the Mt. Lake region and throughout its range generally. Collected from Goodwin's Ferry on the New River up to MLBS (Cascades, upper Little Stony Creek, Garden of the Gods, Hunters Branch, Cold Spring, Mud Branch, etc.). Dates of collection: 23 and 30 May, 12-17 and 21-28 June, 2-9 and 14-26 July, 4-5 and 26-29 August, 4 and 10 September. According to Rogers (1930:36), the larvae occur in saturated silt where there is some flow of water through the soil. DC-349. PR-Newfoundland west to Minnesota, south to Missouri and Georgia.

124. ***Pedicia (Tricyphona) vernalis vernalis***
(Osten Sacken)

A few late-spring records, perhaps earlier spring at the elevation of Mountain Lake; collected near the lake and near Doe Creek, on 11-15 and 21 June. DC-354. PR-Newfoundland west to Ontario, south to Georgia.

125. ***Dicranota (Eudicranota) pallida*** Alexander

Dr. Rogers collected a specimen identified as this species at the Cascades, on 23 June. If correctly identified, it constitutes a new regional record. DC-355. PR-Maine and New Hampshire. Confirmation of this record will not only add another species to the tipulid fauna of Virginia, but also document a perhaps disjunct occurrence of *D. pallida* some 600 miles (965 km) southwest of the currently known range.

126. ***Dicranota (Rhaphidolabina) flaveola***
(Osten Sacken)

A somewhat common species in herbaceous vegetation near upland streams and springs (Mud Branch, Cold Spring), collected on 21-22 and 29-30 May, 12-14 June and 13 July. Alexander (1942: 358) says “the larvae

live in wet earth.” DC-359. PR-Newfoundland west to Michigan, south in mountains to western North Carolina.

127. *Dicranota (Plectromyia) confusa* (Alexander)

Uncommonly collected from streamside herbage, in late spring, in montane habitats (Pond Drain, Mud Branch). Dates: 23-24 May, 1-5 June. DC-359. PR-New Brunswick west to Quebec, south in mountains to South Carolina.

128. *Dicranota (Rhaphidolabis) avis* (Alexander)

Scattered summer collections along upper Little Stony Creek and one of its tributaries (Hemlock Branch; also at Cascades), on 24-27 June, 17 July, 26-28 August. DC-361. PR-Maine southward in mountains to western North Carolina.

129. *Dicranota (Rhaphidolabis) cayuga* (Alexander)

This widespread species has rarely been collected near Mt. Lake (7 April and 27 August). Habitat is marshy areas with ferns and broad-leaved plants overhanging small brooks, both in Clover Hollow and at MLBS. DC-361. PR-Newfoundland northwestward to Alaska, south to Oregon, Colorado, and North Carolina.

130. *Dicranota (Rhaphidolabis) forceps* (Alexander)

Found in a variety of aquatic to marshy habitats at elevations from the mouth of Spruce Run near Goodwins Ferry up to Hunters Branch (also Pond Drain, Cold Spring). Dates: 20-30 May, 18 and 25 June, 12 and 26 July. DC-361. PR-Nova Scotia west to Michigan, south to Tennessee.

131. *Dicranota (Rhaphidolabis) rubescens* (Alexander)

Rogers identified as this species a specimen collected in shaded vegetation overhanging a small brook just east of MLBS, on 5 September. While Alexander (1965) indicated the species was limited to New York, New England, and nearby Canada, he had earlier identified *D. rubescens* from two sites in western North Carolina (Alexander, 1941: 302). There is a possibility that all three records were based on somewhat atypical specimens of the very similar *D. cayuga*. DC-364. PR-Nova Scotia south to New York and Massachusetts.

132. *Dicranota (Rhaphidolabis) tenuipes* (Osten Sacken)

Although this species has, in parts of its range, two generations a year, all the records from the Mt. Lake vicinity are for late summer: 15-29 August, 5-7

September. The flies were swept from shaded vegetation along small streams (Mud Branch, Hunters Branch, Pond Drain). DC-364. PR-New Brunswick west to Michigan and south to Maryland; accordingly, this occurrence of *D. tenuipes* is a new state record and southernmost for the species.

133. *Paradelphomyia (Oxyrhiza) americana* (Alexander)

Rogers recorded this late summer species only rarely (27 August, 4-5 September), in shaded herbaceous growth along small upland streams (south fork of Hunters Branch, Mud Branch). Larval habitat: see *Paradelphomyia pleuralis*. DC-367 (as *Oxydiscus americanus*). PR-New Brunswick west to Michigan, south to South Carolina.

134. *Paradelphomyia (Oxyrhiza) cayuga* (Alexander)

An uncommon summer species at this latitude, taken in shaded herbaceous growth along Hunters Branch and near White Pine Lodge on Little Stony Creek, 19-29 August. DC-367. PR-Maine west to Michigan, south to Pennsylvania; thus, Virginia records constitute a significant extension of range of about 400 miles (640 km).

135. *Paradelphomyia (Oxyrhiza) pleuralis* (Dietz)

Rather common in the vicinity of the Biological Station in late spring, 20-29 June; also along Hunters Branch and at Cascades of Little Stony Creek. Larvae, probably of this species, were said to occur in “organic silt along stream margins or in cool seepage areas” (Alexander, 1965:59). DC-367. PR-Nova Scotia west to Michigan, south to Florida.

136. *Epiphragma fasciapenne* (Say)

Commonest and most widespread of the North American members of its genus, found in shaded to partly shaded, broad-leaved vegetation at all elevations in the region (Sinking Creek, Cold Spring, Little Stony Creek, Hunters Branch, Mud Branch, and on trail to Bald Knob). Collected in late spring, 20-29 May, 8-30 June, 2 July. Larvae “in moist decaying wood” (Alexander, 1942:368). DC-368. PR-Newfoundland west to Alberta, south to Louisiana and Florida.

137. *Epiphragma solatrix* (Osten Sacken)

Only sporadically swept from much the same kind of habitats as *E. fasciapenne* (Sinking Creek, Goodwin’s Ferry, MLBS), on 22 May, 7 July, 2 and 26 August. Larvae in damp, rotten wood; sometimes found together

with larvae of *E. fasciapenne* (see Rogers, 1933:53 for more details). DC-369. PR-New York west to Missouri, south to Louisiana and Florida (also found in some parts of northern neotropics).

138. *Austrolimnophila (Austrolimnophila) toxoneura*
(Osten Sacken)

A common mid-summer species taken by sweeping shaded herbaceous plants (Mud Branch, MLBS, Hunters Branch, Pond Drain, trail to Bald Knob, Wind Rock, Cold Spring, Little Stony Creek, Cascades, and down to Sinking Creek and Kire). Collection dates: 27-30 May, 9-30 June, 1-19 and 25 July, 8 August. DC-373. PR-Newfoundland west to Wisconsin, south to Tennessee and North Carolina.

139. *Dactylolabis (Dactylolabis) cubitalis*
(Osten Sacken)

In 1946, Rogers found this species together with blepharocerids “abundant” and resting on leaves of jewelweed (*Impatiens*) on a steep, shaded hillside above Sinking Creek, near Tawney’s Cave, on 22 May. I found it similarly abundant along upper Doe Creek, 3100 feet (945 m), in streamside vegetation, primarily jewelweed, and on rocks in the stream, on 27 May 1972. At that time, males and females were about equally numerous. DC-370. PR-New York west to Wisconsin, south to Indiana and North Carolina.

140. *Dactylolabis (Dactylolabis) hudsonica* Alexander

Rogers collected these flies resting on foliage of ferns and herbaceous plants growing in and near a seepage area at the foot of a talus slope, shaded by hemlock and hardwoods (Cold Spring). Dates of collection: 30-31 May and 3 June. DC-370. PR-Newfoundland and Quebec, south to Tennessee and North Carolina.

[***Dactylolabis (Dactylolabis) pemetica*** Alexander]

This species almost certainly occurs in the Mountain Lake area but so far has not been identified in our collections. DC-369. PR-Maine west to Ohio, south to western North Carolina.

141. *Pseudolimnophila (Pseudolimnophila) contempta*
(Osten Sacken)

A common and widespread species, found in a variety of moist, woodland habitats (e.g., Hunters Branch, Sinking Creek), on shaded herbaceous vegetation; many dates, June through August. DC-375. PR-Newfoundland

west to Michigan, south to Missouri and Florida.

142. *Pseudolimnophila (Pseudolimnophila) luteipennis*
(Osten Sacken)

A widespread species occasionally collected from partially shaded ferns, grasses, and broad-leaved herbs, such as among alder shrubs in Little Meadows along Little Stony Creek, or a farm pond (Hoges Pond) near U. S. Highway 460 about 3.2 miles (5.2 km) east of Pembroke. Collection dates: 25 June, 3, 11, and 26 July. DC-375. PR-Maine west to California, south to Florida.

143. *Prolimnophila areolata* (Osten Sacken)

Swept fairly commonly from shaded ferns and herbaceous plants in moist upland woods, in late spring and early summer. Collections along Mud Branch, Hunters Branch, Pond Drain, Garden of the Gods, etc., on 19-26 May, 5, 13-14, and 19-28 June, 1-4 July. In his field notes (#109, Hunters Branch, 24 May), Rogers said of this species “... appears to be emerging from the soil of moist spots in the valley floor--well away from the rill.” DC-371. PR-Newfoundland west to Wisconsin, south to Tennessee and North Carolina.

144. *Limnophila (Lasiomastix) macrocera* (Say)

A summer species usually found in vegetation near water (Mud Branch, MLBS, White Rock Branch) but occasionally elsewhere (Wind Rock, 4100 ft [1250 m]). Rogers (1933:54) found larvae of a southern subspecies of *macrocera* in “saturated organic silt” along margins of brooks and in seepage areas (see also Rogers, 1930:38). Collection dates: 17-29 June, 9-13 and 28-30 July, and 5-12 and 20 August. DC-380. PR-Nova Scotia west to Michigan, south to Illinois and Florida.

145. *Limnophila (Lasiomastix) tenuicornis*
Osten Sacken

A late spring and early summer species taken in a variety of moist habitats (Mud Branch, Hunters Branch, Pond Drain, Little Stony Creek, Clover Hollow, Kire). Dates: 24-29 May, 6-17 June. DC-381. PR-Nova Scotia and Ontario south to South Carolina.

146. *Limnophila (Eutonia) alleni* Johnson

This large *Limnophila* was only rarely collected. It occurred in upland deciduous woods, where it was swept from herbaceous undergrowth (Mud Branch, south fork of Hunters Branch), on 4, 15, and 25 June, and two females were taken at light (MLBS), on 19 June 1990 and 20 July

1992. DC-390. PR-New England, New York, and Ohio, according to Alexander (1965). Alexander (1941: 304) reported two specimens from the mountains of western North Carolina, but he later (Alexander, 1944: 129) determined these to belong to *L. (E.) phorophragma* Alexander, a species defined by the presence of a supernumerary cross-vein between R_5 and M_1 and an unusually long abdomen. Neither of these applies to specimens from Mountain Lake, which can be regarded as new state records as well as the southernmost for the species.

147. ***Limnophila (Prionolabis) rufibasis sedula***
Alexander

Several records from sweeping shaded vegetation near small streams during the second half of May: Mud Branch, Hunters Branch, Cold Spring, near Little Stony Creek, etc., 19-30 May. DC-392 (as typical form). PR-mountainous western North Carolina, and eastern Tennessee; new state record for Virginia and northward range extension.

148. ***Limnophila (Elaeophila) aprilina*** Osten Sacken

Apparently rare in the Mt. Lake area; records from vicinity of Kire (793 m, 2600 ft.) and White Pine Lodge on Little Stony Creek (945 m, 3100 ft.), 27 May and 8 June, respectively. DC-385. PR-Newfoundland south in Appalachian Mountains to South Carolina.

149. ***Limnophila (Elaeophila) irene*** Alexander

The few records of this species indicate a late spring to early summer occurrence (19-27 June, 8-10 July) and considerable elevational distribution (Sinking Creek, Little Stony Creek above the Cascades, Pond Drain) in streamside vegetation. DC-385. PR-Ontario and Michigan south to South Carolina.

150. ***Limnophila (Elaeophila) johnsoni*** Alexander

Alexander (1941: 304) found this species "only in the zone of northern hemlock," above 3200 feet (975 m), in western North Carolina. While there is no clear hemlock zone in the Mountain Lake vicinity, there are patches of hemlock in or near some of the places where *L. johnsoni* was found (MLBS, Hunters Branch, Mud Branch, Pond Drain), all above 3700 feet (1128 m). Dates of collection: 23 May, 1-15 and 25-26 June. DC-386. PR-New Brunswick and Quebec south to eastern Tennessee and mountainous western South Carolina.

151. ***Limnophila (Elaeophila) seticellula*** Alexander

A species of the southern Appalachians, previously reported only from mountainous North and South Carolina. Swept from herbaceous growth along upland streams (Little Stony Creek, Pond Drain) in early summer (11-18 and 27 June, 17 July). DC-not included. PR-North and South Carolina; the Virginia records represent a northern range extension.

152. ***Limnophila (Elaeophila) solstitialis*** Alexander

Often collected in streamside-side vegetation (Mud Branch, Hunters Branch, MLBS at light, Cascades, Clover Hollow) in early summer (14-30 June, 1-20 and 28 July, 4, 15, and 26 August). DC-386. PR-Maine west to Michigan, south to northern Florida.

153. ***Limnophila (Dicranophragma) angustula***
Alexander

Numerous collections from herbaceous growth in several places in the area (Little Stony Creek, Mud Branch, MLBS, Hunters Branch, Pond Drain, Clover Hollow) during summer (17-28 June, 2-30 July, 2-27 August). DC-382. PR-Newfoundland west to Michigan, south to eastern Tennessee and northern Florida.

154. ***Limnophila (Arctolimnophila) subcostata***
(Alexander)

One of the more commonly collected species of *Limnophila* in the area, found along Hunters Branch, Pond Drain, and near Little Stony Creek (White Pine Lodge) in late spring. Dates of collection: 21-27 May, 4-18 June. DC-404. PR-Newfoundland west to Michigan, south to Pennsylvania, our specimens thus extending the range some 200 miles (320 km) southward.

155. ***Limnophila (Atopolimnophila) laricicola***
Alexander

Taken more often at lights (MLBS) than in its natural habitat (e.g., Mud Branch, Hunters Branch), on 9-30 June (11 different days), 1-11 and 18 July. DC-407 (as subgenus *Limnophila*). PR-Newfoundland west to Michigan, south to Tennessee.

156. ***Limnophila (Euphylidorea) adustoides*** Alexander

Dr. Rogers swept this species from grasses and herbaceous plants growing beneath alder shrubs along Little Stony Creek above the Cascades on 8, 17, and 26

June. I found it among grasses and ferns along Mud Branch on 26 May and 20-24 June. It was never common. DC-397. PR-Massachusetts west to Indiana, south to Tennessee.

157. ***Limmophila (Euphylidorea) albipes*** Leonard

Found along Sinking Creek and at higher elevations (Little Stony Creek, Pond Drain, Hunters Branch) on several dates: 25-30 June, 1-7 and 14-26 July, 22 August. DC-405 (as subgenus *Limmophila*). PR-Vermont south to South Carolina.

158. ***Limmophila (Euphylidorea) fumidicosta*** Alexander

Another primarily northeastern species found by Rogers near upper Pond Drain and near Little Stony Creek, only on 31 May and 18 June. DC-400. PR-Maine to New York; Mt. Lake specimens thus extend the known range at least 400 miles (640 km) southward.

159. ***Limmophila (Euphylidorea) globulifera*** Alexander

Occurs in several upland habitats, such as Cascades, Hunters Branch, and upper Pond Drain, in lush, shaded, broad-leaved vegetation. Collected 24-28 May, 6, 13, and 20-29 June, 1-2 and 13 July. DC-not included. PR-western North Carolina; Mt. Lake specimens extend the known range somewhat.

160. ***Limmophila (Euphylidorea) niveitarsus***

Osten Sacken

Found on a few dates in late spring (23-30 May, 2-6 and 13-14 June), but also 22-27 June and 20 July, along Hunters Branch and at Wind Rock vicinity. DC-407 (as subgenus *Limmophila*). PR-Massachusetts south to Tennessee and North Carolina.

161. ***Limmophila (Euphylidorea) novae-angliae***
Alexander

Collected at light (MLBS near Mud Branch) and near Little Stony Creek, on 8 and 23-26 June, 3 July. DC-402. PR-Maine and Quebec south to Pennsylvania; the known range is thus extended over 250 miles (about 400 km).

162. ***Limmophila (Phylidorea) fratria*** (Osten Sacken)

Occasionally collected in low, leafy vegetation along Pond Drain, in late spring (2 and 27 May, 5 June). DC-400. PR-Maine and Vermont south to Pennsylvania; accordingly our specimens are a new regional record as well as a new southern range extreme.

163. ***Limmophila (Phylidorea) lutea*** Doane

Swept from low vegetation in hemlock-rhododendron area about 500 m east of MLBS, also taken along Hunters Branch and at light near Mud Branch. Dates: 21-22 and 30 May, 5 June. DC-401. PR-Newfoundland south to Tennessee.

164. ***Shannonomyia lenta lenta*** (Osten Sacken)

A fairly common summer species on broad-leaved herbaceous plants near streams (Hunters Branch, Mud Branch, Pond Drain, meadows along Little Stony Creek, Sinking Creek). Collected on 2, 8, and 15-28 June, 2-12 and 18-30 July, 8 and 23-29 August, and 7-12 September. DC-409. PR-Newfoundland west to Illinois, south to Tennessee and Georgia.

165. ***Pilaria quadrata*** (Osten Sacken)

Collected from rank streamside vegetation (Hunters Branch, Pond Drain, upper Little Stony Creek, Sinking Creek, Mud Branch) in late spring and summer (23 and 29 May, 4-17 and 24-30 June, 1-8 and 21 July, 8-9 and 25-29 August, and 5 September). DC-412. PR-Nova Scotia west to Iowa, south to Tennessee and Florida.

166. ***Pilaria recondita*** (Osten Sacken)

Apparently as abundant as *P. quadrata* and as frequently collected in many of the same habitats (Mud Branch, Hunters Branch, Pond Drain, Little Stony Creek above the Cascades, etc.), this appears to have a somewhat more limited seasonal occurrence (6, 11-18, and 23-30 June, 1-26 July, 5-12 and 29 August). DC-412. PR-Nova Scotia west to Minnesota, south to Louisiana and Florida.

167. ***Pilaria tenuipes*** (Say)

Found at upper elevations (e.g., MLBS, Little Meadows beside Little Stony Creek) but also at lower sites than other *Pilarias* in the region (New River at mouth of Spruce Run, Goodwin's Ferry, Sinking Creek). Dates of collection: 22 May, 18-26 June, 5-10 and 18-26 July, 26-29 August, 12 September. DC-413. PR-New Brunswick west to Minnesota, south to Kansas, Texas, and Florida.

168. ***Ulomorpha pilosella*** (Osten Sacken)

Swept from streamside herbaceous vegetation (Mud Branch, Hunters Branch, Little Stony Creek at Cascades and Little Meadows, Pond Drain and Clover Hollow), on

27 May, 4-13 and 20-30 June, 1-7, 18, and 26 July, 14-27 August and 5-7 September. DC-414. PR-Nova Scotia west to Michigan, south to Tennessee and South Carolina.

169. *Hexatoma (Hexatoma) megacera* (Osten Sacken)

Collected while flying above or near streams at relatively low elevations (Sinking Creek, Big Stony Creek near Kire), and only rarely (22 and 27 May). DC-416. PR-Quebec and Ontario south to Indiana and Virginia.

170. *Hexatoma (Eriocera) albitarsus* (Osten Sacken)

A conspicuous summer species collected near Hunters Branch and South Fork of Pond Drain, also along Doe Creek (near 3100 ft., or 945 m) 2-5 and 23-25 July, 15-16 and 24 August. DC-418. PR-Pennsylvania west to Iowa, south to Florida.

171. *Hexatoma (Eriocera) aurata* (Doane)

Only three individuals were found: a female on 9 August, in Clover Hollow, and two males, 10 and 20 August, in White Rocks Forest Service campground. On 10 August, two males were seen flying in a vertical pattern about a foot in height, as if in a swarm (cf. Rogers, 1930: 42). Rogers (1930) found larvae in a *Sphagnum* bog and beneath wet mosses on rock. DC-418. PR-western North Carolina and eastern Tennessee south to Florida.

172. *Hexatoma (Eriocera) brachycera* (Osten Sacken)

Males were found flying rapidly and low (<5 cm) over small pools in an upper branch of Doe Creek on 27-28 June, 11 and 20-25 July, and 4 August; also over shallow water at White Rock Forest Service campground on 19 July. DC-419. PR-Newfoundland west to Ontario, south to Tennessee and North Carolina.

173. *Hexatoma (Eriocera) brevioricornis* Alexander

Apparently an uncommon species in the Mt. Lake vicinity, found only six times (Cascades, Hunters Branch, upper Doe Creek), on 29 June, 13 and 20 July and 12, 15, and 16 August. DC-419. PR-Quebec and New England south to Tennessee and North Carolina.

174. *Hexatoma (Eriocera) cinerea* (Alexander)

Collected on the wing over water or swept from streamside vegetation along Sinking Creek, at Cascades and Little Meadows along Little Stony Creek, and on Hunters Branch, 17-29 June and 8 July. Rogers (field notes) found several teneral individuals that had probably

emerged around 1500 h from a brook in Little Meadows. DC-419. PR-Quebec west to Minnesota, south to Tennessee and South Carolina.

175. *Hexatoma (Eriocera) fuliginosa* (Osten Sacken)

Only a few individuals of this species have been collected in the Mt. Lake area—along Sinking Creek and Little Stony Creek (Cascades, etc.). Dates of collection: 17-23 and 29 June, 8 and 22 July. DC-420. PR-New Hampshire west to Michigan, south to northern Florida.

176. *Hexatoma (Eriocera) spinosa* (Osten Sacken)

Rarely collected and only from vegetation along Sinking Creek, on 8 and 28 August. I have seen four males from nearby Pulaski County (KU collection; 27 August) and two from farther north (Bath Co., in Clemson Univ. collection). DC-421. PR-Newfoundland west to Illinois, south to Pennsylvania. Thus, the southern Virginia specimens constitute a range extension of about 450 km (280 mi).

177. *Atarba (Atarba) picticornis* Osten Sacken

Commonly swept from shaded, broadleaved, herbaceous vegetation, also attracted to lights, in early summer. Collections made at Mud Branch, MLBS, Hunters Branch, Pond Drain, and near Kire, 21-30 June, 2-25 July. The larvae “occur in wet, rotten, hardwood logs” (Rogers, 1930: 42). DC-423. PR-New Hampshire west to Michigan, south to Missouri and Florida.

178. *Elephantomyia (Elephantomyia) westwoodi westwoodi* (Osten Sacken)

One of the more easily recognized crane flies because of its long, slender rostrum, nearly as long as the entire body, this species (or subspecies) is common among shaded herbaceous plants, sometimes away from water. Collected near Mud Branch, Hunters Branch, Pond Drain, Garden of the Gods, Cascades, and Wind Rock, on 23-24 May, 3, 10-13, and 19-30 June, 1-5 and 12-27 July, 3-12 August. Larvae in wet, decayed hardwood logs or large branches in and by brooks. I have noticed much size variation among individuals taken on the same date and in the same habitat. DC-423. PR-Newfoundland west to Wisconsin, south to Illinois and northern Florida.

179. *Neocladura delicatula* (Alexander)

Dr. Rogers collected this late-summer species from herbaceous vegetation and low shrubs along Hunters Branch, on 3 September, and found numerous individuals (mostly males, many teneral, recently emerged) along

Saltpeper Branch, about 1 km northeast of MLBS, on 12 September. DC-426 (as *Cladura*). PR-Maine west to Michigan, south to Tennessee and South Carolina.

180. **Gnophomyia tristissima** Osten Sacken

Widespread but only occasionally found in the Mt. Lake vicinity, this small, black crane fly with white halteres was taken in Clover Hollow, at the Cascades and Cold Spring, along Hunters Branch, Mud Branch, upper Little Stony Creek, and at MLBS. Dates of collection: 27 May, 7 and 14-27 June, 2, 13-15, and 23-28 July, 3-5 and 9-14 August, 10 September. Rogers (1930: 45) found the immature forms "beneath the loose bark or in the wood of moist, rotting hardwood logs." DC-430. PR-Quebec westward to the Northwest Territories, south to Texas and Florida.

181. **Gonomyia (Lipophleps) sulphurella** Osten Sacken

Although common in some Appalachian areas, this species was only occasional in the Mt. Lake area (e.g., Mud Branch, MLBS at light, Hunters Branch, Clover Hollow, Goodwin's Ferry, Sinking Creek). Dates of collection: 22 May, 23-28 June, 10, 22, and 28 July, 18-20 and 26 August. Rogers (1930: 45) observed that "the larvae occur in saturated earth that ranges from coarse sand to fine silt, but are much more frequent and abundant in distinctly sandy situations." DC-436. PR-Newfoundland west to Kansas, south to Texas and Florida.

182. **Gonomyia (Gonomyia) bidentata** Alexander

Has been found in the Mt. Lake vicinity only at the Cascades of Little Stony Creek, on 15 July and 28 August. DC-440. PR-New Brunswick west to Wisconsin, south to Indiana and Connecticut. The few Virginia specimens therefore extend the known range considerably southward in the Appalachians.

183. **Gonomyia (Gonomyia) subcinerea** Osten Sacken

In all cases, this species was found in mesic woods near water (along Little Stony Creek near White Pine Lodge, MLBS along brook from water supply spring, Clover Hollow). Dates of collection: 7 and 21-24 June, 22 and 28 July, 4 August. DC-441. PR-Newfoundland west to British Columbia, south to Utah, Kansas, and Florida.

184. **Teucholabis (Teucholabis) complexa**
(Osten Sacken)

Collected only once by Dr. Rogers, in ferns and

jewelweed shaded by the mesic forest in Clover Hollow, on 28 July. Larvae were found near the surface in moist to wet, decaying logs (Rogers, 1930: 46). DC-432. PR-Connecticut west to Michigan, south to Oklahoma and Florida.

185. **Teucholabis (Teucholabis) immaculata** Alexander

Again a single record from Rogers' collecting, woods near MLBS, 24 June. DC-432. PR-Tennessee west to Indiana, south to Georgia.

186. **Teucholabis (Teucholabis) lucida** Alexander

Another species of *Teucholabis* collected in the area by Rogers only once, sweeping streamside herbaceous plants and overhanging willows along Sinking Creek, 30 August. DC-432. PR-District of Columbia west to Missouri, south to Florida.

187. **Rhabdomastix (Sacandaga) mediovena** Alexander

Dr. Rogers found this species beside Sinking Creek and upper Little Stony Creek (near White Pine Lodge), in a small montane bog. Collected on 8-10 July and 3 August. DC-not included. PR-South Carolina; Rogers' specimens thus represent a northern range extension of about 200 miles (320 km).

188. **Lipsothrix sylvia** (Alexander)

Found at several upland sites (Mud Branch, Hunters Branch, Pond Drain) but also at Kire (2689 ft; 820 m) and along Sinking Creek (1780 ft; 543 m) in the valleys. Collection dates: 22 and 29 May, 18-27 June, 1-10 July. Larva, pupa, and ecological distribution were described by Rogers & Byers (1956) based on collections made near Mt. Lake. Larval habitat is sodden, decayed wood. DC-431. PR-Nova Scotia south in Appalachians to North Carolina and Tennessee.

189. **Cheilotrichia (Empeda) stigmatica** (Osten Sacken)

Collected on various dates without clear pattern of seasonal occurrence: 19-21 May, 1, 7-8, and 13 June, 12 and 22 August, 7 September. Sites: Hunters Branch, Mud Branch, MLBS at light, Clover Hollow. Larvae were found in a shaded, well-rotted log on damp soil near a brook in Clover Hollow. DC-446. PR-Newfoundland west to South Dakota, south to Tennessee and North Carolina.

190. **Erioptera (Symplecta) cana** (Walker)

This very common and unusually widespread crane

fly has only rarely been found in the Mt. Lake vicinity, possibly because it is an early spring species in much of its range and was flying before Rogers or I were in the area. Mt. Lake specimens taken on 6 April (Sinking Creek) and 21 May (Pond Drain). DC-444. PR-southern Canada and throughout United States.

191. **Erioptera (Erioptera) chlorophylla** Osten Sacken

An early summer species found in upland environments (Mud Branch, Hunters Branch, Pond Drain), this small, pale green crane fly was swept from shaded streamside herbaceous plants on 23-28 June, 1-2, 12, and 19-28 July, 5 August. DC-449. PR-Nova Scotia west to Minnesota, south to Tennessee and Florida.

192. **Erioptera (Erioptera) chrysocoma** Osten Sacken

Like the previous species, an early summer crane fly, collected along Sinking Creek but more often at higher elevations (e.g., Mud Branch, Cascades, Pond Drain, Hunters Branch). Dates of collection: 17-26 June, 5-16, 22, and 30 July, 2 and 8 August. DC-450. PR-New Brunswick and Quebec south to North Carolina.

193. **Erioptera (Erioptera) megophthalma** Alexander

A single female collected at light (MLBS) on 4 August is judged to be of this species as it lacks thoracic markings characteristic of *E. vespertina* (q.v.). DC-450. PR-Newfoundland west to Michigan, south to Tennessee and North Carolina.

194. **Erioptera (Erioptera) septemtrionis** Osten Sacken

Collected at lights (MLBS, Mud Branch near MLBS) more often than by general collecting (Cascades), on 19 May, 12 and 28-29 June, 12-19 and 26 July, and 2 August. DC-452. PR-Newfoundland west to Washington, south to California, Kansas, and Florida.

195. **Erioptera (Erioptera) vespertina** Osten Sacken

Found only rarely and only at relatively low elevations (Sinking Creek, Hoge's Pond about 3.2 miles [5.2 km] east of Pembroke), on 3 and 22 July. DC-453. PR-Nova Scotia west to Iowa, south to Alabama and Florida.

196. **Erioptera (Mesocyphona) caliptera** Say

A widespread and commonly collected species, swept from shaded herbaceous plants near New River (Goodwins Ferry, Mouth of Spruce Run) but also at upland sites (Pond Drain, Mud Branch, MLBS); often

taken at light. Numerous dates, early June to 20 August. DC-457. PR-Newfoundland west to California, south to Florida.

197. **Erioptera (Mesocyphona) needhami** Alexander

Collected in shaded vegetation along Mud Branch, upper Little Stony Creek and in Little Meadows, and near White Rock Branch; also at light at MLBS. Dates of collection: 7 and 21-28 June, 3-10 and 17-21 July, 5-10, 18-19, and 21 August. DC-457. PR-Nova Scotia west to Missouri, south to Florida.

198. **Erioptera (Mesocyphona) parva** Osten Sacken

A common species in the central Appalachian Mountains but collected only once (18 July by Rogers) on the bank of Big Stony Creek at Kire (2689 ft; 820 m). There are numerous regional records (western North Carolina, eastern Tennessee) from early June to mid-August. DC-457. PR-Connecticut west to Michigan and Kansas, south to Florida.

199. **Erioptera (Hoplolabis) armata** Osten Sacken

Found in streamside vegetation along Sinking Creek but also at higher elevations (Pond Drain, Hunters Branch, Mud Branch - MLBS, at light). Dates of collection are scattered: 23 May, 5 and 22 July, 24 and 30 August. DC-459. PR-Newfoundland west to Colorado, south to Oklahoma and Georgia.

200. **Erioptera (Psiloconopa) armillaris** Osten Sacken

Only occasionally collected in the Mt. Lake vicinity (Clover Hollow, upper Little Stony Creek, southwest of Kire, near 3150 ft [960 m]), and once on Kelly Flats on Big Stony Creek, about 2550 ft [777 m]), on 7 June, 18 and 25-26 July. DC-460. PR-Nova Scotia west to Kansas, south to North Carolina.

201. **Erioptera (Psiloconopa) indianensis** Alexander

Like the last species, found only occasionally on herbaceous plants near streams (Sinking Creek, Little Stony Creek, Clover Hollow), on 22 May, 7 June, and 22 July. DC-460. PR-Michigan west to Iowa, south to Missouri and Kentucky. Finding this crane fly far to the east in the Ridge & Valley Province of Virginia was somewhat surprising.

202. **Erioptera (Psiloconopa) sweetmani** Alexander

Dr. Rogers collected this southern species at three relatively lowland sites (Sinking Creek, Big Stony Creek

at Kire, and Kelly Flats near Big Stony Creek), on 27 May and 9-10 July. DC-not included. PR-northern Georgia; accordingly, discovery of *E. sweetmani* in Virginia constitutes a range extension of nearly 300 miles (480 km) northward and presages its discovery in western North Carolina.

203. *Erioptera (Psiloconopa) venusta venusta*
Osten Sacken

Collected in mesic woods at Clover Hollow on 7 June and 4 July; also at light, MLBS, 18 July. Rogers (1933: 60) described the habitat of the immature forms as "saturated to very wet, organic soil and sandy silt." DC-461. PR-Maine and Quebec west to Wisconsin, south to Missouri and Florida. (Alexander [1956] described subspecies *E. venusta nubilosa* from Michigan within the indicated range of the typical form.)

204. *Ormosia (Scleroprocta) innocens* (Osten Sacken)

This vernal species was swept from streamside herbaceous plants and ferns at various elevations (Clover Hollow and Doe Creek on 6 and 7 April; Hunters Branch on 24-30 May and 13 June). When Rogers and I collected in Clover Hollow and along Doe Creek in early April, most trees were still leafless. Alexander (1920: 956; figs. 404-406) described the unusual larva, as "Eriopterine No. 1." In the same work, he described also the pupa (Alexander, 1920: 923; figs. 376-378). DC-469. PR-New Hampshire west to Michigan, south to Tennessee and South Carolina.

205. *Ormosia (Ormosia) adirondacensis* Alexander

Apparently an upland species, found in mesic woods (Hunters Branch, Pond Drain), 24-29 May, 4-6, 13, and 20-26 June, 19 August. Dr. Rogers (field notes) observed *O. adirondacensis* in mating swarms of "three or four to 20 individuals, usually about the end of a lower branch," the swarm about 3 to 5 feet (0.9-1.5 m) above the ground, from approximately 1700-1800 h. DC-465. PR-Nova Scotia south to Tennessee.

206. *Ormosia (Ormosia) apicalis* Alexander

Swept from leafy streamside vegetation in upland habitats (Cascades, Pond Drain, Hunters Branch) in early summer (20-28 June, 7 July). DC-466. PR-New York southward in mountains to Georgia.

207. *Ormosia (Ormosia) brevicealcarata* Alexander

Probably the most commonly collected *Ormosia* in the Mt. Lake area (Cascades, Pond Drain, Hunters

Branch, Cold Spring, Mud Branch, Garden of the Gods, Mouth of Spruce Run on New River). Found throughout summer: 22-26 June, 2-6 July, 14-29 August, 3-10 September. DC-466. PR-mountainous western North Carolina; occurrence in Appalachian Virginia represents an extension of range as well as a new state record.

208. *Ormosia (Ormosia) holotricha* (Osten Sacken)

Rarely collected in the vicinity of MLBS, along the south fork of Hunters Branch, on 21 May. DC-469. PR-New Hampshire south to Tennessee and North Carolina.

209. *Ormosia (Ormosia) monticola* (Osten Sacken)

Apparently a late-summer species, found on shaded herbaceous vegetation near water (Pond Drain, Hunters Branch, Cold Spring, near White Pine Lodge on Little Stony Creek). Dates of collection: 8-26 August, 3-10 September. DC-471. PR-New Brunswick west to Michigan, south to North Carolina.

210. *Ormosia (Ormosia) nigripila* (Osten Sacken)

Only collected twice, by Rogers, once near Big Stony Creek near Kire and once at light, at MLBS, near Mud Branch, June. DC-472. PR-Newfoundland west to Michigan, south to Florida.

211. *Ormosia (Ormosia) nimbipennis* Alexander

Found in several upland habitats, not always near water (Mud Branch, Hunters Branch, Wind Rock) in late summer (29 July, 18-25 August, 3-10 September). DC-472. PR-Newfoundland west to Michigan but south only to Connecticut, so discovery of the species in western Virginia constitutes a range extension of about 500 miles (800 km).

212. *Ormosia (Ormosia) pygmaea* (Alexander)

In parts of its range, this species has a spring generation, from May to early July, yet we have collected it near Mt. Lake (Hunters Branch, Pond Drain, upper Little Stony Creek) only in late summer (14-29 July, 4-10 September). DC-473. PR-New Brunswick west to Michigan, south to North Carolina.

213. *Ormosia (Ormosia) romanovichiana* Alexander

A scattering of collections, possibly indicative of two generations each summer (Pond Drain, Clover Hollow, and "Moonshine Dell," a somewhat marshy area with rhododendron and hemlock, just east of MLBS).

Collected on 7 April in Clover Hollow, at higher elevations on 23 May, 5 June, and 5 September. DC-473 (as *O. nubila*, a preoccupied name). PR-Maine west to Illinois, south to Tennessee and South Carolina.

214. **Ormosia (Ormosia) rubella** (Osten Sacken)

Found only in late summer on shaded, streamside herbage along Mud Branch, Hunters Branch, and Saltpeter Branch, an east-flowing brook a short distance north of MLBS. Dates of collection: 7-12 September. DC-475. PR-Newfoundland west to Wisconsin, south to Georgia.

215. **Ormosia (Ormosia) tennesseensis** Alexander

An occasionally collected species in relatively lowland habitats (along Sinking Creek, Doe Creek, and in Clover Hollow), on 6-7 June and 4-9 August. I found these flies in an apparent mating swarm in Clover Hollow on 9 August. DC-not included. PR-Tennessee; thus, Mt. Lake specimens show a moderate range extension.

216. **Ormosia (Ormosia) townesi** Alexander

Encountered only once (19 August by Dr. Rogers) in small swarms beneath mesic forest canopy but 7 to 20 feet (2.1-6.1 m) above ground along Hunters Branch. (*O. adirondacensis* also swarming in same habitat.) DC-475. PR-North Carolina. Rogers' specimens indicate a northward range extension of approximately 120 miles (193 km).

217. **Tasiocera (Dasymolophilus) ursina** (Osten Sacken)

Smallest species of crane fly in eastern North America (wing length about 2.5 mm), occasionally seen in small swarms near streams (Mud Branch, Hunters Branch, MLBS at light, Cascades). Collected on 21-25 June, 5 and 22-30 July. DC-476. PR-Newfoundland south to Tennessee and North Carolina.

218. **Molophilus (Molophilus) cramptoni** Alexander

Found chiefly in grassy areas and ferns beside small streams (brook at south edge of Mt. Lake, south fork of Hunters Branch). Collected 11-13 and 23 June. DC-478. PR-Maine west to Michigan, south to Tennessee and South Carolina.

219. **Molophilus (Molophilus) floridensis** Alexander

Rogers twice collected flies identified as this species, in a meadow beside Little Stony Creek and in a somewhat marshy area just east of MLBS, on 22 May and 17 June.

DC-479. PR-Florida. Accordingly, these specimens represent a remarkable northward extension of range, some 500 miles (800 km), into a totally different topographic region.

220. **Molophilus (Molophilus) forcipulus forcipulus** (Osten Sacken)

Usually found in bog habitats and only once collected in the Mt. Lake vicinity. Rogers found *M. forcipulus* on Kelly Flats, a small valley draining into Big Stony Creek about 3 mi (5 km) WSW of Kire, 18 July. DC-478. PR-New Brunswick west to Wisconsin, south to Tennessee and Florida.

221. **Molophilus (Molophilus) fultonensis** Alexander

Probably the most frequently encountered *Molophilus* in the Mt. Lake area, occurring in mesic forest, among shaded herbaceous plants (Cascades, Pond Drain, Clover Hollow, Kire, Cold Spring, upper Little Stony Creek, Hunters Branch, Mud Branch, and MLBS). Collection dates: 26 and 31 May, 7-17 and 24-30 June, 1-22 July, 5-12, 18, and 25-28 August, 3-10 September. DC-479. PR-Maine west to Wisconsin, south to South Carolina and Tennessee.

222. **Molophilus (Molophilus) hirtipennis** (Osten Sacken)

A late spring species, found in several habitats in which low, leafy vegetation is shaded (Sinking Creek, Kire, upper Little Stony Creek, Cold Spring, Hunters Branch, Pond Drain, Mud Branch, and MLBS). Dates of collection: 22-31 May, 2-12 and 26 June. Larva and pupa were described by Alexander (1920: 912, plates 65-66). DC-479. PR-Newfoundland west to Minnesota, south to Illinois and South Carolina.

223. **Molophilus (Molophilus) perflaveolus** Alexander

An uncommonly widespread species yet found only once, by Rogers, near Little Stony Creek below the Cascades, on 11 June. It was reported as extremely common in western North Carolina (Alexander, 1941: 319) and eastern Tennessee (Rogers, 1930: 49) (both as *M. auricomus*). DC-478 (as *M. auricomus*). PR-western U.S. and British Columbia; also Tennessee, North Carolina.

224. **Molophilus (Molophilus) pubipennis** (Osten Sacken)

Collected over a wide range of dates and from low to high elevations (mouth of Spruce Run near Goodwin's

Ferry, Kire, Clover Hollow, head of Doe Creek, Mud Branch, MLBS at light), on 27 May, 7, 19, and 25 June, 10 and 19 July, 14 and 26 August. Females were abundant in streamside vegetation in Clover Hollow on 7 June. DC-483. PR-Newfoundland west to Michigan, south to Florida.

Family Trichoceridae

These “winter crane flies” have been found in the Mt. Lake vicinity, but, as their common name indicates, they are not on the wing during seasons in which Rogers or I were at MLBS so are not within the scope of this paper.

Family Ptychopteridae

In eastern North America, two species in this family are known as “phantom crane flies.” Both are characterized by long legs held out to the sides in drifting flight and by alternating black and white on the legs.

225. *Bittacomorphella jonesi* (Johnson)

Found in marshy, usually shaded habitats (Hunters Branch, White Rock Branch, near Little Stony Creek), on 31 May, 6, 21-25, and 30 June, 4-6 and 22-26 July, 9-10 August. In his field notes, Rogers gave the name “*Bittacomorphella* Bog” to a shaded, mossy seepage area at the junction of Mud Branch and Hunters Branch, where he found this species abundant. Alexander (1920:781, plates 16, 17) described the larvae, which he had found in “rich organic mud in shaded woods.” DC-186. PR-New Brunswick west to Michigan, south to South Carolina.

226. *Bittacomorpha clavipes* (Fabricius)

Like the previous species, a denizen of marshy, usually shaded habitats (Little Meadows near upper Little Stony Creek, Mud Branch, near Kire and Big Stony Creek, White Rock Branch). Dates of collection: 23-27 May, 21 June, 18 and 30 July, 26 August. I found *Bittacomorpha clavipes* and *Bittacomorphella jonesi* in the same habitat, at White Rock Branch, on 21 June. As pointed out by Alexander (1920: 784, plate 18), larvae and adults of *B. clavipes* are more often found in open swamps and wet meadows. DC-187. PR-Newfoundland west to Manitoba, south to Arizona and Florida.

LITERATURE CITED

Alexander, C. P. 1919. New nearctic crane-flies (Tipulidae, Diptera). Part VIII. Canadian Entomologist 51: 191-199.

Alexander, C. P. 1920. The crane-flies of New York. Part II, Biology and phylogeny. Cornell University Agricultural Experiment Station, Memoir 38: 691-1133.

Alexander, C. P. 1940. Records and descriptions of North American crane-flies (Diptera). Part I. Tipuloidea of the Great Smoky Mountains National Park, Tennessee. American Midland Naturalist 24: 602-644.

Alexander, C. P. 1941. Records and descriptions of North American crane-flies (Diptera). Part II. Tipuloidea of mountainous western North Carolina. American Midland Naturalist 26: 281-319.

Alexander, C. P. 1942. Family Tipulidae. Pp. 196-486 In G. C. Crampton, C. H. Curran, & C. P. Alexander, Guide to the Insects of Connecticut, Part VI. The Diptera or True Flies of Connecticut, First Fascicle. State Geological and Natural History Survey of Connecticut, Bulletin No. 64. (Addenda on pp. 486a-b of 1966 reprint edition.)

Alexander, C. P. 1944. Undescribed species of crane-flies from the eastern United States and Canada (Dipt.: Tipulidae). Part VIII. Entomological News 55: 125-129.

Alexander, C. P. 1956. Undescribed species of crane-flies from the eastern United States and Canada (Dipt.: Tipulidae). Part XII. Entomological News 67: 177-185.

Alexander, C. P. 1965. Family Tipulidae. Pp. 16-90 In A. Stone, C. W. Sabrosky, W. W. Wirth, R. H. Foote, & J. R. Coulson (eds.), A Catalog of the Diptera of America North of Mexico. Agriculture Handbook No. 276, U. S. Department of Agriculture, Washington, DC.

Alexander, C. P., & G. W. Byers. 1981. Tipulidae. Pp. 153-190 In J. F. McAlpine, B. V. Peterson, G. E. Shewell, H. J. Teskey, J. R. Vockeroth, & D. M. Wood (eds.), Manual of Nearctic Diptera, Vol. 1. Research Branch, Agriculture Canada, Monograph 27. Ottawa, Ontario, Canada.

Brodo, F. 1967. A review of the subfamily Cylindrotominae in North America (Diptera: Tipulidae). The University of Kansas Science Bulletin 47: 71-115.

Byers, G. W. 1961. The crane fly genus *Dolichoheza* in North America. The University of Kansas Science Bulletin 42: 665-924.

Byers, G. W. 1979. Summer crane flies of Lake Itasca vicinity, Minnesota. The University of Kansas Science

Bulletin 52: 603-613.

Byers, G. W. 1996. Tipulidae. Pp. 549-570 In R. W. Merritt & K. W. Cummins (eds.), An Introduction to the Aquatic Insects of North America. Third Edition. Kendall/Hunt Publishing Co., Dubuque, Iowa.

Doane, R. W. 1900. New North American Tipulidae. Journal of the New York Entomological Society 8: 182-198.

Gelhaus, J. K. 1986. Larvae of the crane fly genus *Tipula* in North America (Diptera: Tipulidae). The University of Kansas Science Bulletin 53: 121-182.

Hart, C. A. 1895. On the entomology of the Illinois River and adjacent waters. First paper. Bulletin of the Illinois State Laboratory of Natural History 4: 149-273.

Johannsen, O. A. 1910. Insect notes for 1909. Maine Agricultural Experiment Station Bulletin 177: 21-44.

Malloch, J. R. 1917. A preliminary classification of Diptera, exclusive of Pupipara, based upon larval and pupal characters, with keys to imagines in certain families. Part I. Bulletin of the Illinois State Laboratory of Natural History 12: 161-409.

Merritt, R. W., & K. W. Cummins (eds.). 1996. An Introduction to the Aquatic Insects of North America. Third Edition. Kendall/Hunt Publishing Company, Dubuque, Iowa. 862 pp.

Oosterbroek, P. 1984. Revision of the crane-fly genus *Nephrotoma* Meigen, 1803, in North America (Diptera, Tipulidae). Part II: The non-*dorsalis* species-groups. Beaufortia 34: 117-180.

Peterson, A. 1951. Larvae of Insects. Part II. Coleoptera, Diptera, Neuroptera, Mecoptera, Trichoptera. Printed for

the author by Edwards Brothers, Ann Arbor, Michigan. 416 pp.

Rogers, J. S. 1930. The summer crane-fly fauna of the Cumberland Plateau in Tennessee. Occasional Papers of the Museum of Zoology, University of Michigan No. 215: 1-50.

Rogers, J. S. 1933. The ecological distribution of the crane-flies of northern Florida. Ecological Monographs 3: 1-74.

Rogers, J. S., & G. W. Byers. 1956. The ecological distribution, life history, and immature stages of *Lipsothrix sylvia* (Diptera: Tipulidae). Occasional Papers of the Museum of Zoology, University of Michigan No. 572: 1-14.

Stone, A., C. W. Sabrosky, W. W. Wirth, R. H. Foote, & J. R. Coulson (eds.). 1965. A Catalog of the Diptera of America North of Mexico. Agriculture Handbook No. 276, U. S. Department of Agriculture, Washington, DC. 1,696 pp.

Tangelder, I. R. M. 1983. Revision of the crane fly genus *Nephrotoma* Meigen, 1803, in North America (Diptera, Tipulidae). Part I: the *dorsalis* species-group. Beaufortia 33: 111-205.

Young, C. W. 1978. Comparison of the crane flies (Diptera: Tipulidae) of two woodlands in eastern Kansas, with a key to the adult crane flies of eastern Kansas. The University of Kansas Science Bulletin 51: 407-440.

Young, C. W. 1981. The immature instars of *Tipula (Platytipula) ultima* Alexander (Tipulidae, Diptera). Journal of the Kansas Entomological Society 54: 409-415.

Young, C. W. 1987. A revision of the crane fly genus *Dicranoptycha* in North America. The University of Kansas Science Bulletin 53: 215-274.